

CS5760

Usability Test Report

Team 3 : NRGR – App: PG&E Reducer

Soham Sheth(ssheth1@mtu.edu)

Introduction:

PG&E Reducer



Team 3 has been working on the web application named **PG&E Reducer**. This is a web application for PG&E customers that allows them to visualize their heat and electric consumption through easily readable and understandable graphical representations. The app also shows trends and recurring energy spikes and gives the customer advice to help reduce their energy consumption as well as their energy costs.

Here's a link to the :

Initial design document:

<http://www.csl.mtu.edu/classes/cs4760/www/projects/s23/group3/www/initialDesignDocument>

Final Design Changes :

<http://www.csl.mtu.edu/classes/cs4760/www/projects/s23/group3/www/ImprovedVersion>

To evaluate the usability of the application and gather feedback from an unbiased group of participants, usability testing was conducted. The testing process involved a pre-test questionnaire to assess participants' technical knowledge and level of interest. The participants were then asked to perform six different scenarios using the application, and after each scenario, they were asked general questions. During the scenarios, the administrator and development team members recorded various metrics. Finally, a post-test questionnaire was administered to collect participant opinions and any additional feedback they had to offer. The aim of this testing was to measure user performance and identify any areas for improvement in the application's interface. During the scenarios, the administrator and development team members measured performance metrics such as bug identified, assistance needed. Assistance needed was marked when the user needed a prompt or was stuck on some part of the scenario.

Testing Information:

Eight usability testing sessions have been conducted . Each session will be administered by the UX Consultant, Soham Sheth , and three or four members of Team 3.

Session times and development team members attended are as follows:

1. April 10th, 2023 6:00 PM to 7:00 PM (EST)
Developers: Nate Allsop, Peter LaMantia, Zayne Pepin
2. April 10th, 2023 7:00 PM to 8:00 PM (EST)
Developers: Nate Allsop, Peter LaMantia, Zayne Pepin
3. April 10th, 2023 8:00 AM to 9:00 PM (EST)
Developers: Nate Allsop, Peter LaMantia, Zayne Pepin
4. April 10th, 2023 9:00 PM to 10:00 PM (EST)
Developers:Nate Allsop, Peter LaMantia, Zayne Pepin
5. April 13th, 2023 6:00 PM to 7:00 PM (EST)
Developers: Patrick Seidel, Wes Alberg, Jack Snowden, Jack Hayes
6. April 13th, 2023 7:00 PM to 8:00 PM (EST)
Developers: Patrick Seidel, Wes Alberg, Jack Snowden, Jack Hayes
7. April 13th, 2022 8:00 PM to 9:00 PM (EST)
Developers: Patrick Seidel, Wes Alberg, Jack Snowden, Jack Hayes
8. April 13th, 2022 9:00 PM to 10:00 PM (EST)
Developers:Patrick Seidel, Wes Alberg, Jack Snowden, Jack Hayes

The attendance of the users is shown in Appendix-A.

All sessions were held remotely, making use of Zoom as the testing medium. The students were given access to the application only after the testing session began. The administrator and assisting development team members had access to the following:

- A copy of the bug report form that will be recorded on
- A copy of the testing challenges form that will be recorded on

Testing Process:

The testing process was conducted in the following order:

1. A Zoom meeting was created, and a link was provided to the participant one or two days prior to the scheduled testing session. The email reminded the participant that the testing session would be recorded.
2. The Zoom meeting link was provided to all assisting development team members one or two days prior to the scheduled testing session. The email reminded each team member of the role they were to perform.
3. The administrator and assisting development team members arrived at the testing session early to ensure the testing could begin as soon as possible after the participant arrived.
4. A pre-test check was conducted by the administrator to ensure that recording was active, and that screen sharing was enabled.
5. Once the participant arrived, the administrator greeted them and explained the purpose and procedure of the testing.
6. Verbal consent to participate was collected from the participant by the administrator. From this point forward, remaining steps proceeded assuming continuous consent. At any point, the participant could revoke consent and the testing session would be promptly ended.
7. A verbal pre-test questionnaire was then given, and responses were recorded.
8. Once completed, the participant was given the link to the application. They were asked to click the link and share their screen.
9. The following steps were repeated for each scenario:
 - a. The administrator read the current scenario to the participant.
 - b. The participant then attempted to complete the scenario as described to the best of their ability, and was encouraged to think aloud throughout.
 - c. A post-scenario series of questions was then asked to the participant and responses were recorded.
 - d. If this was not the final scenario, the participant was then instructed to close out of the application and click the link again to restart the application.
10. A verbal post-test questionnaire was then given, and responses were recorded.
11. The participant was thanked for their time and participation.
12. The session was concluded.

Pre-Test Questionnaire:

https://docs.google.com/forms/d/14XDOis9NIm9BaxS_VY17WYs6rKyt5ykWxoseiPcq7Z0/edit

1. How interested are you in using an application like this?

- (a) Very Interested
- (b) Interested
- (c) Neutral
- (d) Disinterested
- (e) Strongly Disinterested

2. I believe myself to be proficient at using a computer.

- (a) Strongly agree
- (b) Agree
- (c) Neutral
- (d) Disagree
- (e) Strongly disagree

3. Which browser are you going to use?

- (a) Chrome
- (b) Firefox
- (c) Microsoft Edge
- (d) Safari

4. Have you ever used a similar application in the past?

- (a) Yes
- (b) No

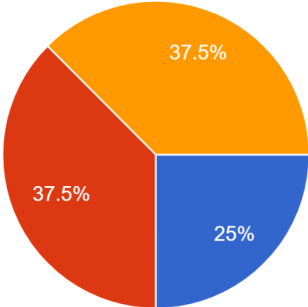
5. Have you ever participated in Usability Testing?

- (a) Yes
- (b) No

Results of pre questionnaire :

How interested are you in using an application like this?

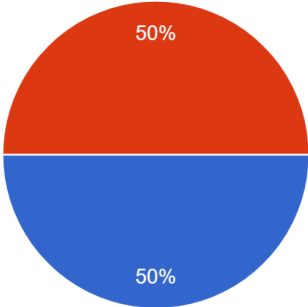
8 responses



- Very Interested
- Interested
- Neutral
- Disinterested
- Strongly Disinterested

I believe myself to be proficient at using a computer.

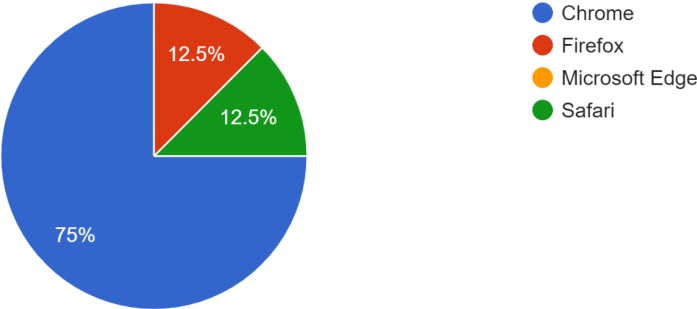
8 responses



- Strong Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

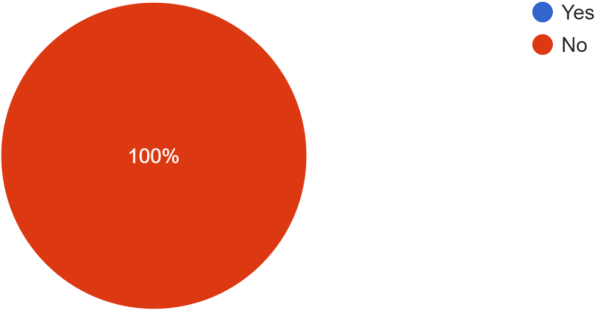
Which browser are you going to use?*

8 responses



Have you ever used a similar application in the past?*

8 responses



Test Scenario 1

Sr. No.	Outline	Outline Description
1.	Test Scenario Name :	Day based testing scenario
2.	Test Goals :	The user could visualize their daily usage on an hourly basis by clicking on the "1D" tab. This displayed a graph or chart that showed usage for each hour, allowing the user to identify patterns and adjust their behavior accordingly.
3.	Required Equipment :	Zoom Conferencing Software, Web browser, Internet connection
4.	Quantitative Measurement :	(a) What mistakes do the participants make? (b) Are the participants able to successfully complete the scenario and record, understand their usage ?
5.	Scenario Description :	This website will be used to check the hourly usage of gas and electricity. You should login with the provided credentials and record your usage according to your usage based on hours.
6.	Task List :	(a) Login using the given credentials. (b) Check electricity usage for entire day using graphs (c) Repeat the scenario for person 1-4 (Electricity Average) (d) Check and understand the environmental impact. (e) Repeat the steps from (b) to (d) for Gas usage instead of electricity usage. (f) Check and understand the Gas averages, Energy Tips (g) Logout
7.	Qualitative Measurements :	(a) How quickly the participant becomes familiar with the graphs. (b) How quickly participant understand the usages (c) Difficulties participant faces while using the webpage
8.	Potential observations of participant:	(a) Participant may struggle to understand the graph visualization Observations to make is whether participants can

		understand the graph and the units used so that next time the appropriate amount of electricity and gas is used. I.e. the purpose of this application is understood by the participant
9.	Questionnaire:	(a) Did you face difficulty with anything? (b) Did you feel that the navigation is intuitive? (c) Do you have any suggestions?
10.	Test Setup Details :	The participants will need to open the website in their browser, using this link: https://pge-app.sachinf.com/ and share their screen on Zoom

Test Scenario 2

Sr. No.	Outline	Outline Description
1.	Test Scenario Name :	Month based testing scenario
2.	Test Goals :	User should be able to properly visualize the daily usage on day basis when clicked on 1M tab
3.	Required Equipment :	Zoom Conferencing Software, Web browser, Internet connection
4.	Quantitative Measurement :	(a) What mistakes do the participants make? (b) Are the participants able to successfully complete the scenario and record their usage ?
5.	Scenario Description :	This website will be used to check the daily usage of gas and electricity. You should login with the provided credentials and record and understand your usage according to your usage based on day.
6.	Task List :	(a) Login using the given credentials. (b) Check electricity usage for entire month using graphs (c) Repeat the scenario for person 1-4 (Electricity Average) (d) Check and understand the environmental impact (e) Repeat the steps from (b) to (d) for Gas usage instead of electricity usage. (f) Check and understand the Gas averages, Energy Tips (g) Logout
7.	Qualitative Measurements :	(a) How quickly the participant becomes familiar with the graphs. (b) How quickly participant understand the usages (c) Difficulties participant faces while using the webpage
8.	Potential observations of participant:	(a) Participant may struggle to understand the graph visualization Observations to make is whether participants can understand the graph and the units used so that next time the appropriate amount of electricity and gas is used. I.e. the purpose of this application is understood by

		the participant
9.	Questionnaire:	(a) Did you face difficulty with anything? (b) Did you feel that the navigation is intuitive? (c) Do you have any suggestions?
10.	Test Setup Details :	The participants will need to open the website in their browser, using this link: https://pge-app.sachinf.com/ and share their screen on Zoom

Test Scenario 3

Sr. No.	Outline	Outline Description
1.	Test Scenario Name :	Year based testing scenario
2.	Test Goals :	User should be able to properly visualize the usage on monthly basis when clicked on 1Y tab
3.	Required Equipment :	Zoom Conferencing Software, Web browser, Internet connection
4.	Quantitative Measurement :	(a) What mistakes do the participants make? (b) Are the participants able to successfully complete the scenario and record, understand their usage ?
5.	Scenario Description :	This website will be used to check the monthly usage of gas and electricity. You should login with the provided credentials and record your usage according to your usage based on month.
6.	Task List :	(a) Login using the given credentials. (b) Check electricity usage for entire year using graphs (c) Repeat the scenario for person 1-4 (Electricity Average) (d) Check and understand the environmental impact (e) Repeat the steps from (b) to (d) for Gas usage instead of electricity usage. (f)Logout
7.	Qualitative Measurements :	(a) How quickly the participant becomes familiar with the graphs. (b) How quickly participant understand the usages (c)Difficulties participant faces while using the webpage
8.	Potential observations of participant:	(a) Participant may struggle to understand the graph visualization Observations to make is whether participants can understand the graph and the units used so that next time the appropriate amount of electricity and gas is used. I.e. the purpose of this application is understood by the participant

9.	Questionnaire:	(a) Did you face difficulty with anything? (b) Did you feel that the navigation is intuitive? (c) Do you have any suggestions?
10.	Test Setup Details :	The participants will need to open the website in their browser, using this link: https://pge-app.sachinf.com/ and share their screen on Zoom

Test Scenario 4

Sr. No.	Outline	Outline Description
1.	Test Scenario Name :	Threshold energy saving using threshold slider
2.	Test Goals :	Users should properly be able to use Threshold Slider.
3.	Required Equipment :	Zoom Conferencing Software, Web browser, Internet connection
4.	Quantitative Measurement :	(a) What mistakes do the participants make? (b) Are the participants able to successfully complete the scenario and record, understand their usage ?
5.	Scenario Description :	The users should be able to do the analysis of threshold energy using threshold sliders for day, month and year for gas and electricity.
6.	Task List :	(a) Login using the given credentials. (b) Check electricity usage using graphs using threshold sliders for day, month and year. (c) Repeat the scenario for gas usage for day, month and year. (d)Logout
7.	Qualitative Measurements :	(a) How quickly the participant becomes familiar with the graphs with the help of a threshold slider ? (b) How quickly participant understand the usages (c)Difficulties participant faces while using the slider
8.	Potential observations of participant:	Participants may struggle to understand the graph visualization using threshold sliders. Observations to make is whether participants can understand the graph and the units used so that next time the appropriate amount of electricity and gas is used. I.e. the purpose of this application is understood by the participant
9.	Questionnaire:	(a) Did you face difficulty with anything? (b) Did you feel that the navigation is intuitive? (c) Do you have any suggestions?

10.	Test Setup Details :	The participants will need to open the website in their browser, using this link: https://pge-app.sachinf.com/ and share their screen on Zoom
-----	----------------------	--

Test Scenario 5

Sr. No.	Outline	Outline Description
1.	Test Scenario Name :	Performing Task in Dark mode
2.	Test Goals :	Users should properly be able to understand all test scenarios from 1-4.
3.	Required Equipment :	Zoom Conferencing Software, Web browser, Internet connection
4.	Quantitative Measurement :	(a) What mistakes do the participants make? (b) Are the participants able to successfully complete the scenario and record, understand their usage ?
5.	Scenario Description :	The users should be able to do the analysis and analysis for day, month and year for gas and electricity.
6.	Task List :	Doing all the steps in dark mode (a) Login using the given credentials. (b) Check electricity usage for entire day,month and year using graphs (c) Repeat the scenario for person 1-4 (Electricity Average) (d) Check and understand the environmental impact (e) Repeat the steps from (b) to (d) for Gas usage instead of electricity usage. (f)Logout
7.	Qualitative Measurements :	(a) How quickly the participant becomes familiar with the graphs with the help of a threshold slider ? (b) How quickly participant understand the usages (c)Difficulties participant faces while using the slider
8.	Potential observations of participant:	Participants may struggle to understand the graph visualization using threshold sliders. Observations to make is whether participants can understand the graph and the units used so that next time the appropriate amount of electricity and gas is used. I.e. the purpose of this application is understood by the participant

9.	Questionnaire:	(a) Did you face difficulty with anything? (b) Did you feel that the navigation is intuitive? (c) Do you have any suggestions?
10.	Test Setup Details :	The participants will need to open the website in their browser, using this link: https://pge-app.sachinf.com/ and share their screen on Zoom

Test Scenario 6

Sr. No.	Outline	Outline Description
1.	Test Scenario Name :	Download the graph in dark and light mode.
2.	Test Goals :	Users should be able to download the graphs in dark mode and light mode and should be able to share the information.
3.	Required Equipment :	Zoom Conferencing Software, Web browser, Internet connection
4.	Quantitative Measurement :	(a) What mistakes do the participants make? (b) Are the participants able to successfully complete the scenario and record, understand their usage ?
5.	Scenario Description :	The users should be able to do the analysis of threshold energy using threshold sliders for day, month and year for gas and electricity.
6.	Task List :	(a) Login using the given credentials. (b) Check electricity usage and gas usage using graphs and downloading the graphs for all time spans (d)Logout
7.	Qualitative Measurements :	(a) How quickly the participant becomes familiar with the graphs with the help of a threshold slider ? (b) How quickly participant understand the usages (c)Difficulties participant faces while using the slider
8.	Potential observations of participant:	Participants may struggle to understand the graph visualization using threshold sliders. Observations to make is whether participants can understand the graph and the units used so that next time the appropriate amount of electricity and gas is used. I.e. the purpose of this application is understood by the participant
9.	Questionnaire:	(a) Did you face difficulty with anything? (b) Did you feel that the navigation is intuitive? (c) Do you have any suggestions?

10.	Test Setup Details :	The participants will need to open the website in their browser, using this link: https://pge-app.sachinf.com/ and share their screen on Zoom
-----	----------------------	--

Post-Test Questionnaire: Link:

https://docs.google.com/forms/d/1g68C2-Ke9v7EiFTo98-HFqIPwixj-tehEz24B_HMNWU/edit

1. Overall, this application was easy to perform tasks in.

- (a) Strongly Agree
- (b) Agree
- (c) Neutral
- (d) Disagree
- (e) Strongly Disagree

2. The navigation across different pages is available and easy

- (a) Strongly Agree
- (b) Agree
- (c) Neutral
- (d) Disagree
- (e) Strongly Disagree

3. Overall performance of the application is good

- (a) Strongly Agree
- (b) Agree
- (c) Neutral
- (d) Disagree
- (e) Strongly Disagree

4. I am satisfied with the performance of the app.

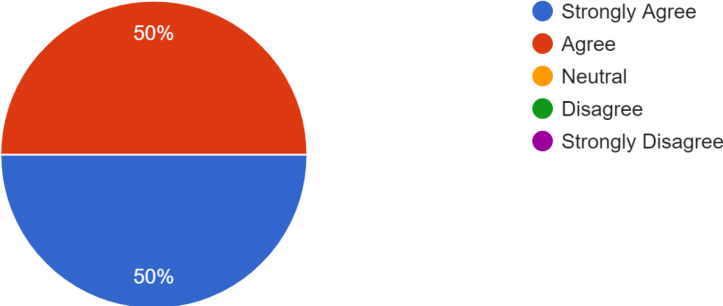
- (a) Strongly Agree
- (b) Agree
- (c) Neutral
- (d) Disagree
- (e) Strongly Disagree

5. I would use this application again.

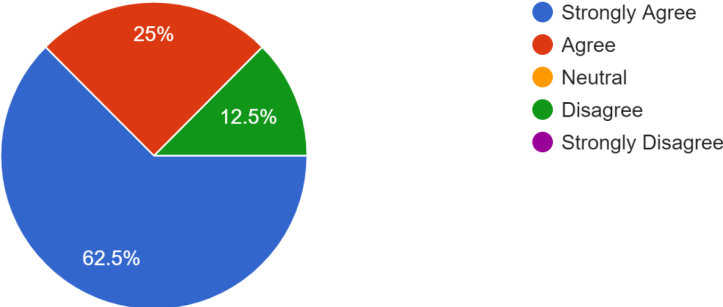
- (a) Strongly Agree
- (b) Agree
- (c) Neutral
- (d) Disagree
- (e) Strongly Disagree

Post-Test Questionnaire results :

Overall, User Interface of Application is simple and easy to use
8 responses

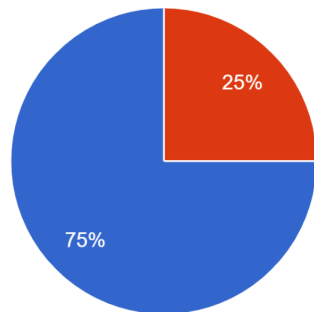


The navigation across different pages is available and easy
8 responses



Overall performance of the application is good

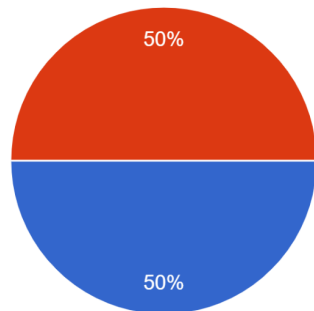
8 responses



- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

I am satisfied with the performance of the app

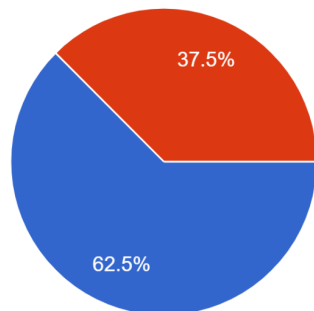
8 responses



- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

I would use this application again.

8 responses



- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Appendix-A:

Undergraduate Student Attendance

Testing Date and Time	Location	Student Name	Attendance
04/10/2022 12:00 PM	Zoom	Kenzie Baker	Yes
04/10/2022 12:00 PM	Zoom	Joshua Pearlman	Yes
04/10/2022 12:00 PM	Zoom	Dauvin Wurst	Yes
04/10/2022 12:00 PM	Zoom	David Cunningham	Yes
04/10/2022 12:00 PM	Zoom	Evan Williams	Yes
04/10/2022 12:00 PM	Zoom	Vimalesh	Yes
04/10/2022 12:00 PM	Zoom	Mahdi Naseri	Yes
04/10/2022 12:00 PM	Zoom	Viraj Mane	Yes

Appendix-B:

Bug Report

Bug Number	Bug Name	Priority	Bug Description
1.	Help Button Unnoticeable	Urgent	The "Help" button on the web page was not easily noticeable
2.	Symbol redirecting to different page	Not Urgent	The page is redirecting to a different page when the user clicks on the environmental impact/energy tips symbol.
3.	Downloading the graph	Not urgent	<ul style="list-style-type: none">• A PDF download option should be provided when downloading graphs, and the threshold bar should not be visible after saving the image.• Additionally, downloading in light mode should not generate a dark mode background.

Appendix-C:

Testing Challenges Form

Challenge Number	Challenge Name	Challenge Description

No testing challenges were identified during the usability test sessions.

Conclusion :

Usability Recommendations

The usability recommendations are presented in the users' own words with little amount being paraphrased, in order to maintain the originality of their suggestions.

- It would be helpful if users could set their household members/size in their profile/settings so that more information can be displayed.
- The information circles (the little 'i' you can click on) should show a popup rather than launching a new webpage, which can be jarring.
- It wasn't clear to some users that they could click on "Therms" and "kWh" for more information, but they appreciated that it required a click rather than just popping up when hovering.
- Users would like more flexibility with the graphs, including multiple colors for multiple weeks to show progress over time.
- The dark mode is appreciated, but some users would like the application to be released with dark mode enabled by default or a different color scheme for light mode.
- A tutorial highlighting and describing each section would be more helpful than the current help menu.
- The titles that refer to "Gas" made some users think of gasoline rather than natural gas.
- The logo appears blurry and makes the webpage look outdated.
- Users would like to see the environmental impact of gas use and suggestions for reducing energy consumption.
- Some users would like to see the amount they spend monthly on gas and electricity.
- The sliders for changing data can be made more apparent, and the info buttons should have a popup or indicator before opening a new tab.
- In night mode, the x and y axes and axis labels can be difficult to read.
- Overall, the web application was excellent and easy to navigate, with relevant and thorough information.