Usability Testing: Heuristic Evaluation For Electricity Maps Text Report
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Summary/Procedure

For this text document that I am providing, I will be conducting a formal Heuristic Evaluation for my usability test. This evaluation will identify/test the usability of Electricity Maps' user interface (UI) that correlates with a user's experience (UX). I have forked the repository of Electricity Maps and ran it locally on my machine to perform my Heuristic Evaluation on Electricity Map's website, which can be found here: https://github.com/Dionmok/electricitymaps-contrib. Next, I will be interacting with the website and will evaluate to see if the website violates any of Jakob Nielson's 10 Heuristics. Next, I will screenshot the identified heuristic violation. Then, I will assign a severity rating to each heuristic violation with a severity rating from Jakob Nielson's Severity Rating Scale, which can be found here: https://www.nngroup.com/articles/how-to-rate-the-severity-of-usability-problems/. Finally, I will provide a suggestion to remedy the identified heuristic violation.

Format

The following will be a template of how I will consolidate each of the heuristic violations in a report:

Heuristic Reviewed #XXX
Violated Heuristic: <Name of one of Jakob Nielson's 10 Heuristics identified on the project>
Issue Observed: <Screenshot of experiences or observed issue>
Explanation: <Issue experienced>
Severity Rating: <Selected from one of Jakob Nielson's 5 severity ratings>
Suggestion for Fixing Heuristic Violation: <How to remedy this feature>

Sources Cited

Nielsen, Jakob. "Severity Ratings for Usability Problems: Article by Jakob Nielsen." *Nielsen Norman Group*, https://www.nngroup.com/articles/how-to-rate-the-severity-of-usability-problems/. Accessed 27 May 2023.

Nielsen, Jakob. "10 Usability Heuristics for User Interface Design." *Nielsen Norman Group*, 15 November 2020, https://www.nngroup.com/articles/ten-usability-heuristics/. Accessed 27 May 2023.

Heuristic Evaluations

Heuristic Reviewed #1
Violated Heuristic: Jakob Nielson's #2 Heuristic: "Match Between System and the Real World" (Nielsen).
Issue Observed:

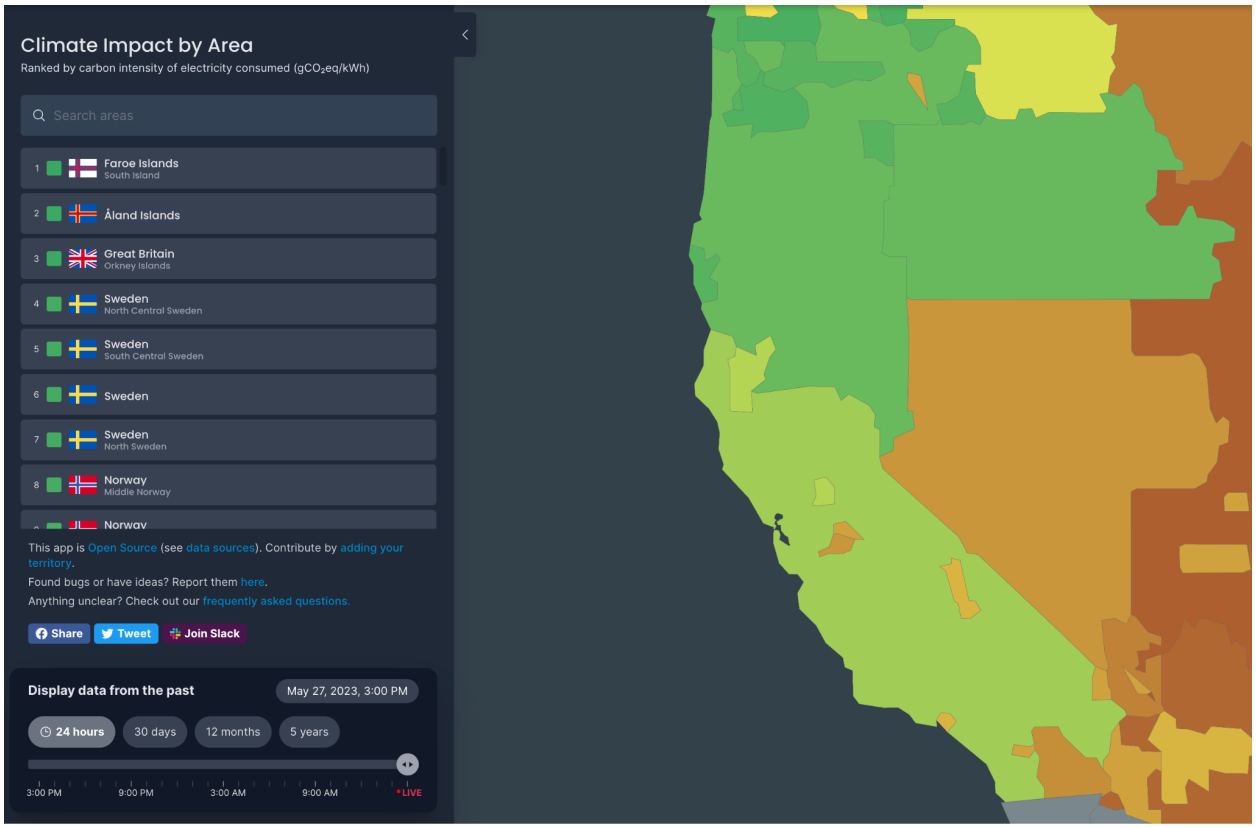

Figure 1. Screenshot of the interactive map displaying California, Oregon and Nevada

Explanation: The heuristic that is being violated is #2 in Jakob Nielson's 10 Heuristics which is "Match Between System and the Real World " (Nielsen). A brief description of this heuristic is that a design should have conventional designs and logical ordering that are familiar to users in the real world (Nielsen). The reasoning for this violation is that in a conventional system/design, states and/or provinces of a country should be clearly delineated with their respective boundaries. In *Figure 1*, there is no clear distinction between California, Oregon, Nevada, and other bordering states. This design violates what people are familiar with, which is state and/or providence boundaries. It is hard for the user to check a certain state and/or providence to see the carbon intensity of the energy consumption and production of energy in a defined area. In the current design, users are forced to click around to guess what state they are looking at.
Severity Rating: The severity rating I give this is a 2: "Cosmetic usability problem: fixing this should be given low priority"(Nielsen). I gave it a severity rating of 2 because it's only a cosmetic design, but it does interrupt the user experience when clicking around for different locations of interest to the user.
Suggestion for Fixing Heuristic Violation: My suggestion to remedy this problem is to provide actual state and provinces actual boundaries to help differentiate between the neighboring

states and/or provinces. Also, I would add a label to each of the states, without having the user hover over it to see what state they are looking at.

Heuristic Reviewed #2
Violated Heuristic: Jakob Nielson's #6 Heuristic: "Recognition Rather Than Recall" (Nielsen).
Issue Observed:

Figure 2. Screenshot of search bar to look up user desired areas of interest, then clicking on the desired state to retrieve the information, and finally pressing the back arrow that directs the user back to the search home page

Explanation: The heuristic that is being violated is #6 in Jakob Nielson's 10 Heuristics which is "Recognition Rather Than Recall "(Nielsen). A brief description of this heuristic is a product's ability to recall information from one part of the program to another, without having the user to recall information from their memory.The reasoning for this violation is that when a user searches for a destination, clicks on it, views the information, and presses the back arrow (See *Figure 2.*), the search history that the user inserted is not saved. Now if the user wants to know what areas they have searched, they must memorize it themselves and have to recall it later. In the current project, the project does not recognize/store the user's search history, resulting in the user to recall their search history information.
Severity Rating: The severity rating I give this is a 3: "Minor usability problem: important to fix, so should be given high priority"(Nielsen). I gave it a severity rating of 3 because it is important for the system to recognize/remember the user's search history so that the user does not have to memorize their search history. I believe by making the user memorizing their search history will take away from the user experience.
Suggestion for Fixing Heuristic Violation: My suggestion to remedy this problem is to have the program remember the user's search history for a single user's session. By doing this, the user will not have to recall their search history, resulting in a more fluid user experience.

Heuristic Reviewed #3
Violated Heuristic: Jakob Nielson's #2 Heuristic: "Match Between System and the Real World" (Nielsen).
Issue Observed:

Figure 3. Screenshot of South America on Electricity Maps'

Explanation: The heuristic that is being violated is #2 in Jakob Nielson's 10 Heuristics which is "Match Between System and the Real World " (Nielsen). A brief description of this heuristic is that a design should have conventional designs and logical ordering that are familiar to users in the real world.The reasoning for this violation is that in a conventional system/design that people are familiar with is auto population of data/results given the current object (what the user is currently viewing) that is being displayed. In *Figure 3*, on the right is the worldview of South America, and on the left is a "quick access" list of results of areas that a user can choose to look at. The problem is that the "quick access" list of results is not reflecting what the user is viewing on the map, which is South America.
Severity Rating: The severity rating I give this is a 3: "Minor usability problem: important to fix, so should be given high priority." I gave it a severity rating of 3 because it is important for the system to correctly correlate the "quick access" list of results of areas and what part of the map is being seen by the user. Furthermore, this violation needs to be fixed so that the correct information can be displayed to the user for a more informative user experience.
Suggestion for Fixing Heuristic Violation: My suggestion to remedy this problem is to have the "quick access" list of results to correlate with what part of the map is being seen by the user.

Heuristic Reviewed #4
Violated Heuristic: Jakob Nielson's #8 Heuristic: "Aesthetic and Minimalist Design" (Nielsen).
Issue Observed:

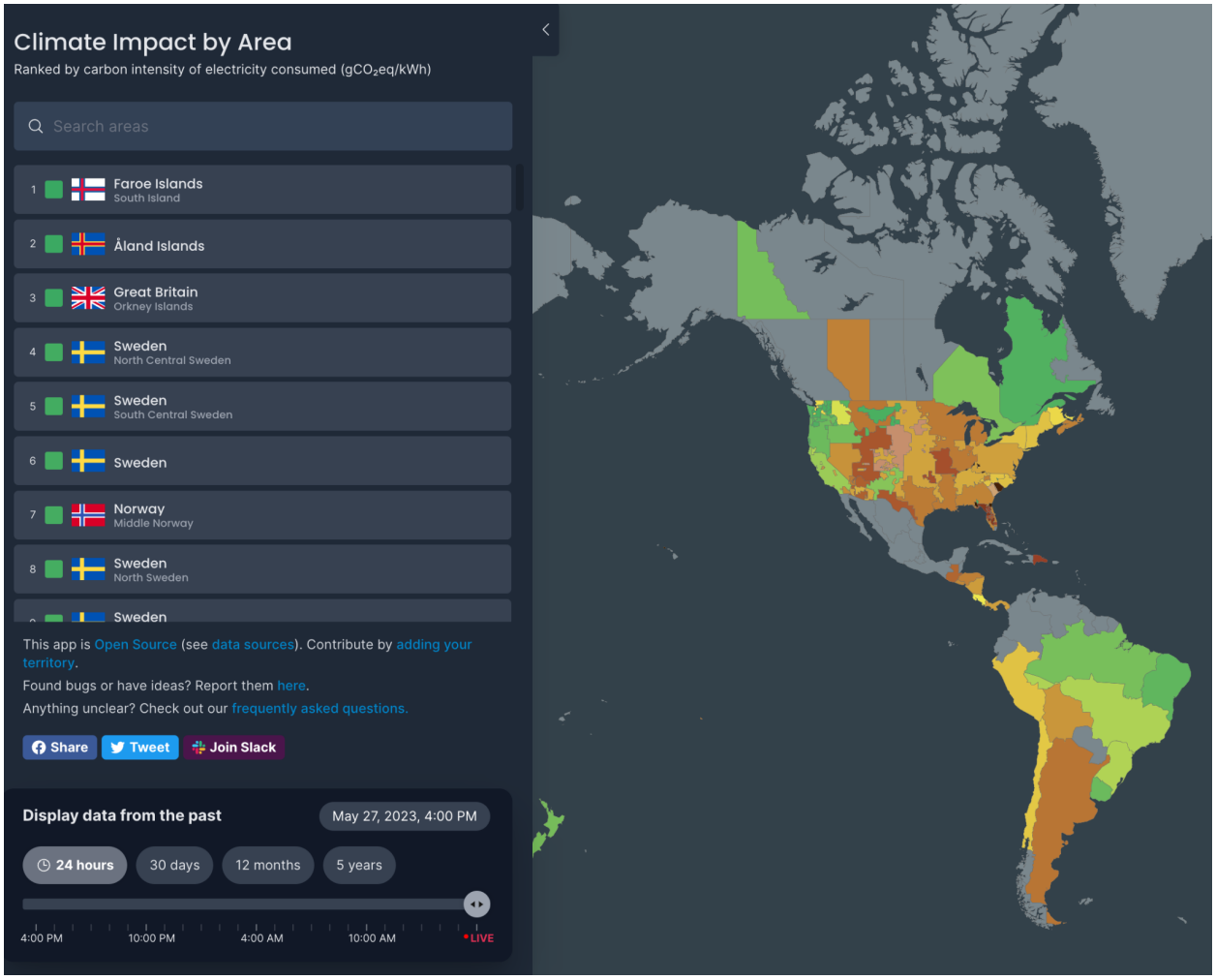

Figure 4. Picture of "Climate Impact by Area" and "Display data from the past"

Explanation: The heuristic that is being violated is #8 in Jakob Nielson's 10 Heuristics which is "Aesthetic and Minimalist Design " (Nielsen). A brief description of this heuristic is that the UI should not be cluttered with unnecessary information to the user. The reasoning for this violation is that the open source links, bug report, and FAQ is displayed in an unaesthetic way that takes up unnecessary space. These text links are taking up valuable real estate from the "Climate Impact by Area" list, which reduces the displayed results. This aesthetic can be handled better because it is not a pleasant element on the screen.
Severity Rating: The severity rating I give this is a 2: "Cosmetic usability problem: fixing this should be given low priority" (Nielsen). I gave it a severity rating of 2 because it's only a cosmetic design, but it does interrupt the user experience when viewing impacted areas of interest.
Suggestion for Fixing Heuristic Violation: My suggestion to remedy this problem is to implement a button functionality like for the socials and apply it to the open source links, bug

report, and FAQ. Next, I would recommend placing horizontally next to each other just like the social media links. This would make the text and functionality more aesthetically pleasing and reduce the clutter on the “Climate Impact by Area” panel.

Heuristic Reviewed #5

Violated Heuristic: Jakob Nielson’s #6 Heuristic: “Recognition Rather Than Recall” (Nielsen).

Issue Observed:

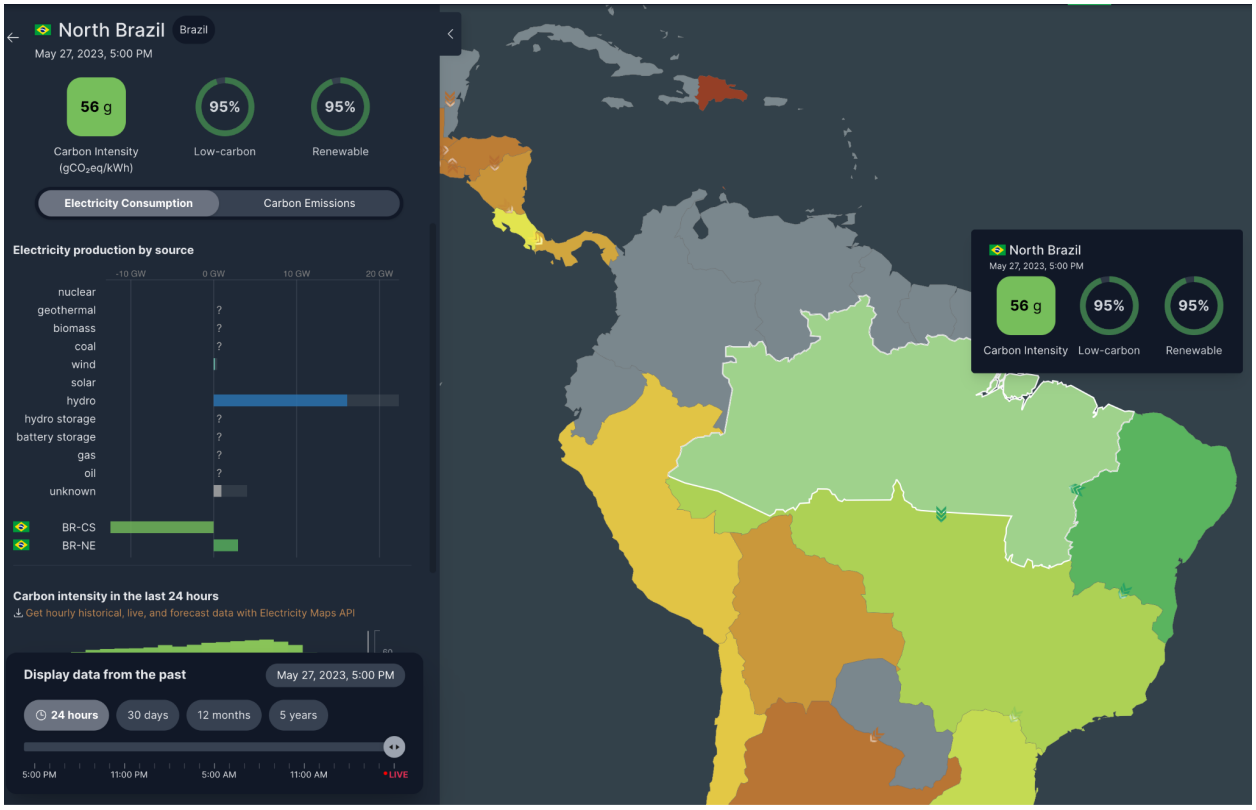

Figure 5. Screenshot of “Climate Impact by Area” which my mouse cursor is hovered (Brazil)

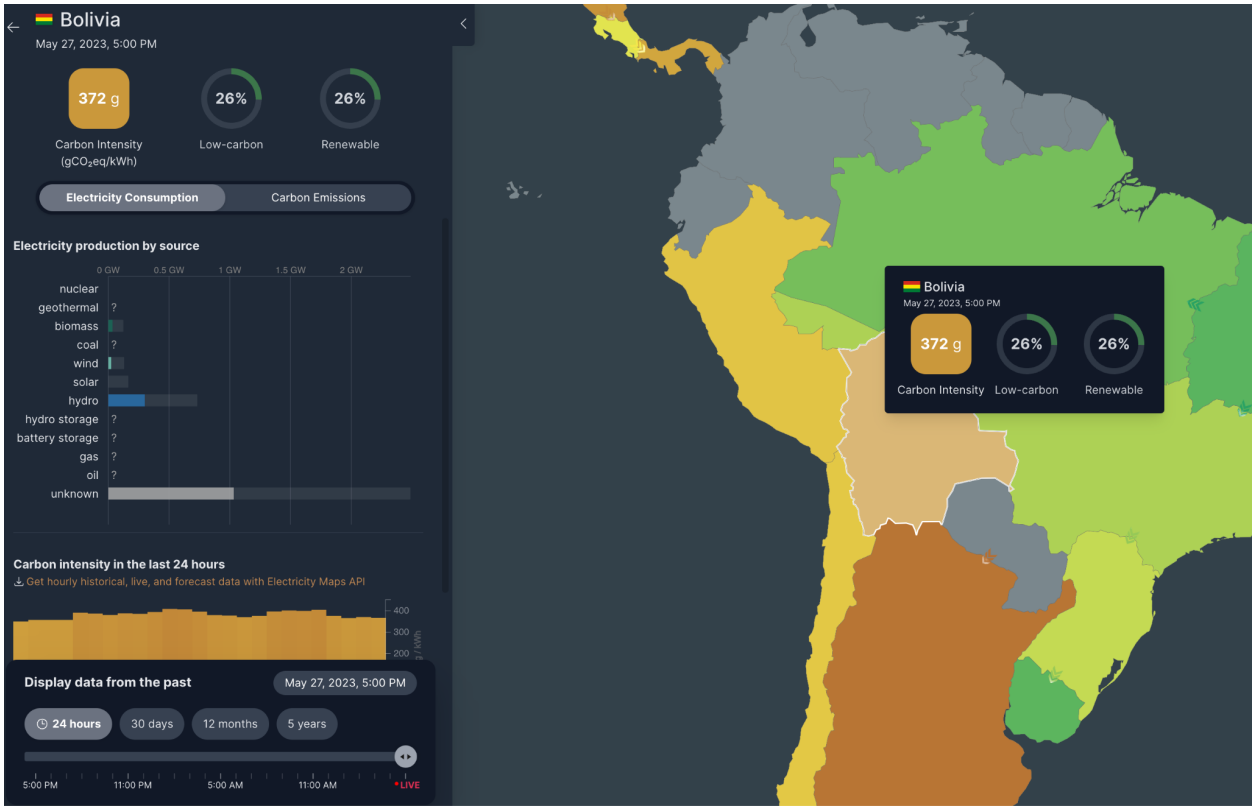

Figure 6. Screenshot of “Climate Impact by Area” which my mouse cursor is hovered (Bolivia)

Explanation: The heuristic that is being violated is #6 in Jakob Nielson’s 10 Heuristics which is “Recognition Rather Than Recall " (Nielsen). A brief description of this heuristic is a product’s ability to recall information from one part of the program to another, without having the user to recall information from their memory.The reasoning for this violation is that when a user hovers and clicks on an area of interest (See *Figure 5* & *Figure 6*), it will display data for that area regarding the carbon intensity of the energy consumption and production of energy in a defined area. Once the user removes their mouse cursor and clicks on a different area of interest (See *Figure 5* & *Figure 6*), then the previous location’s data disappears, causing the user to have to then recall the previous location’s data. I believe by making the user memorize the data from different locations will take away from the user experience and not encourage more user curiosity.

Severity Rating: The severity rating I give this is a 3: “Minor usability problem: important to fix, so should be given high priority” (Nielsen). I gave it a severity rating of 3 because it is important for the system to recognize/remember and display prior locations that the user has visited.

Suggestion for Fixing Heuristic Violation: My suggestion to remedy this problem is to have the program to store a summary of prior locations that the user wants to remember the data for and display it in a summarized table off to the side.

Heuristic Reviewed #6

Violated Heuristic: Jakob Nielson's #9 Heuristic: "Help Users Recognize, Diagnose, And Recover From Errors" (Nielsen).

Issue Observed:

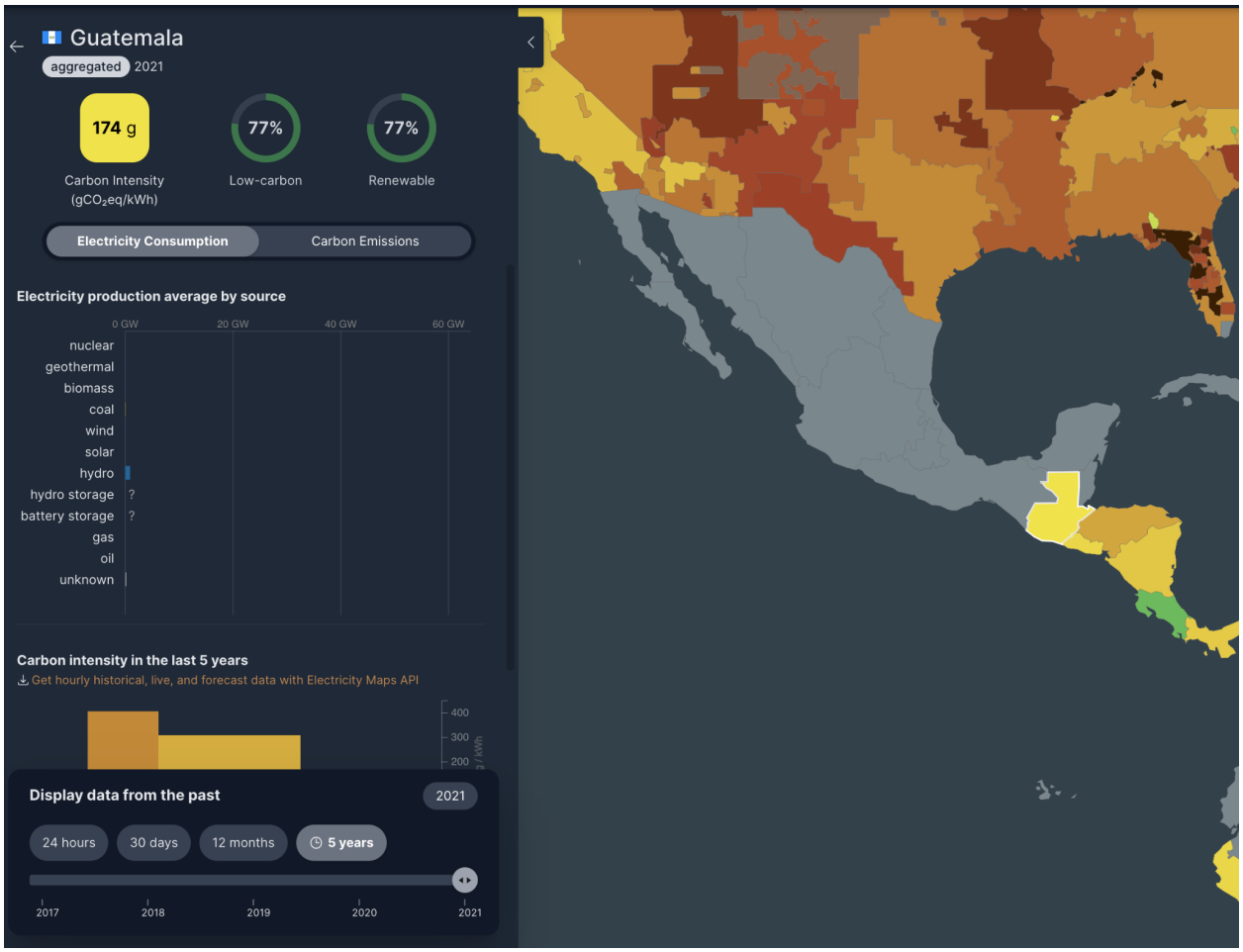

Figure 7. Screenshot of "Climate Impact by Area" of Guatemala in the "Display data from the past" from 2021

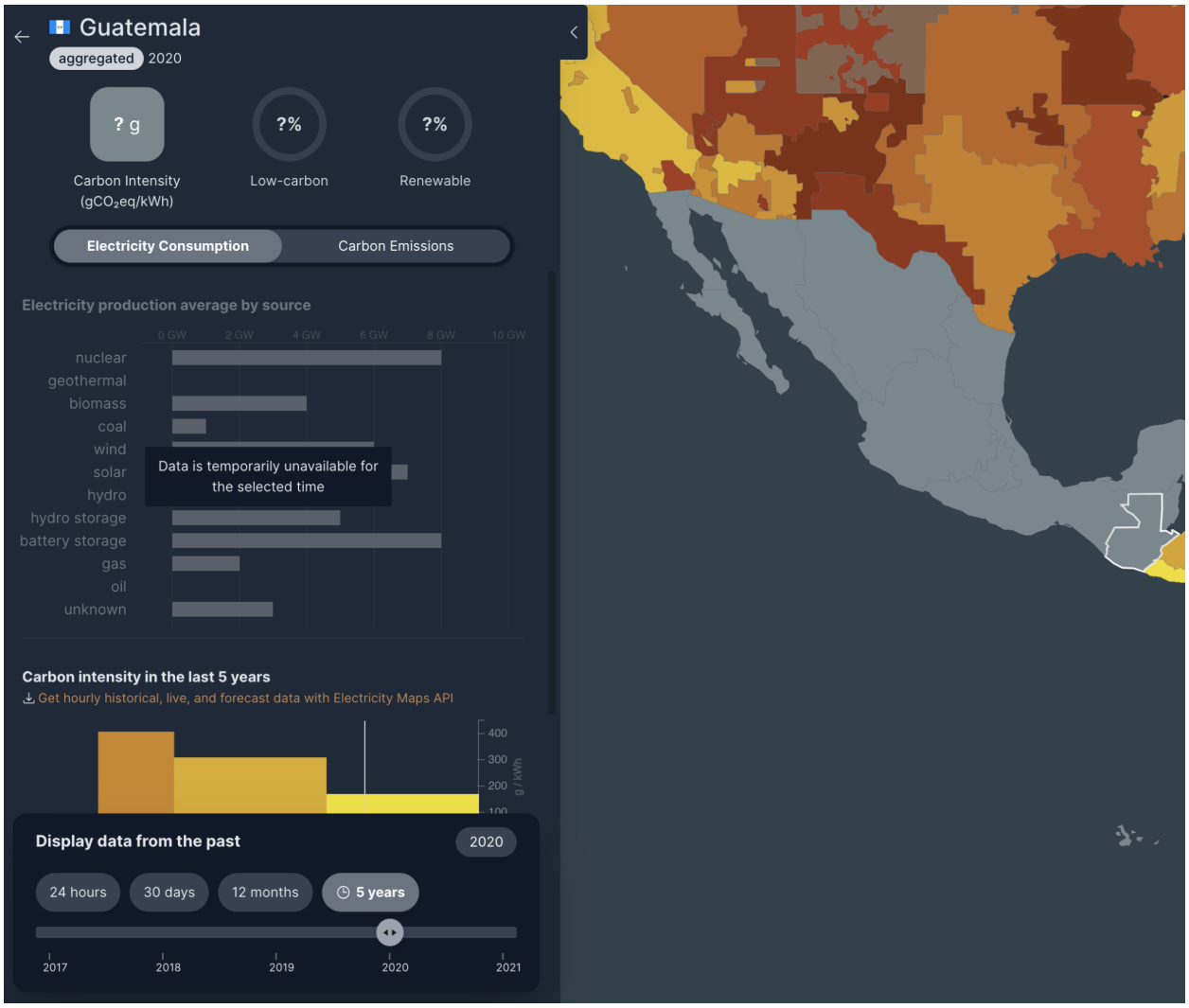

Figure 8. Screenshot of “Climate Impact by Area” of Guatemala in the “Display data from the past” from 2020

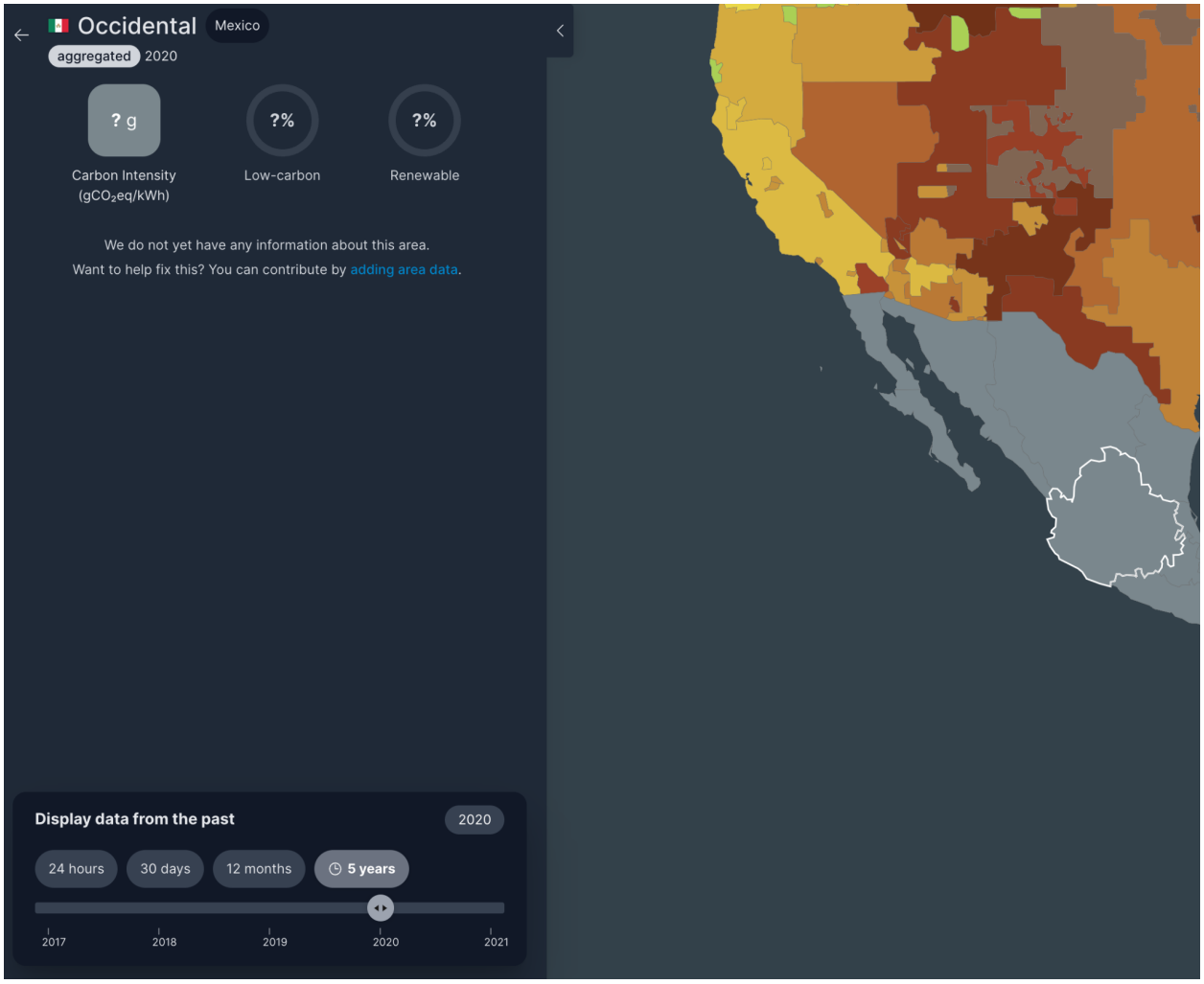

Figure 9. Screenshot of "Climate Impact by Area" of Occidental in the "Display data from the past" from 2020

Explanation: Jakob Nielson's #9 Heuristic: "Help Users Recognize, Diagnose, And Recover From Errors" (Nielsen). A brief description of this heuristic is that the error messages should be constructively explained. The reasoning for this violation is that when a user clicks on Guatemala and views the "Display data from the past" from 2020 (See *Figure 8*)**;** the display panel shows the "Data is temporarily unavailable for the selected time". This message is not correct because in *Figure 9*, if the data is unavailable, the correct message should be: "We do yet have any information about this area. Want to help this? You can contribute by adding area data." This message should be displayed in *Figure 8*.

Severity Rating: The severity rating I give this is a 3: "Minor usability problem: important to fix, so should be given high priority"(Nielsen). I gave it this rating because the correct diagnosis message should be displayed across all of the same instances. This doesn't impact the user experience from a functional standpoint.

Suggestion for Fixing Heuristic Violation: My suggestion to remedy this problem is to correctly display the message in *Figure 9* to *Figure 8*.

Heuristic Reviewed #7
Violated Heuristic: Jakob Nielson's #8 Heuristic: "Aesthetic and Minimalist Design" (Nielsen).
Issue Observed:

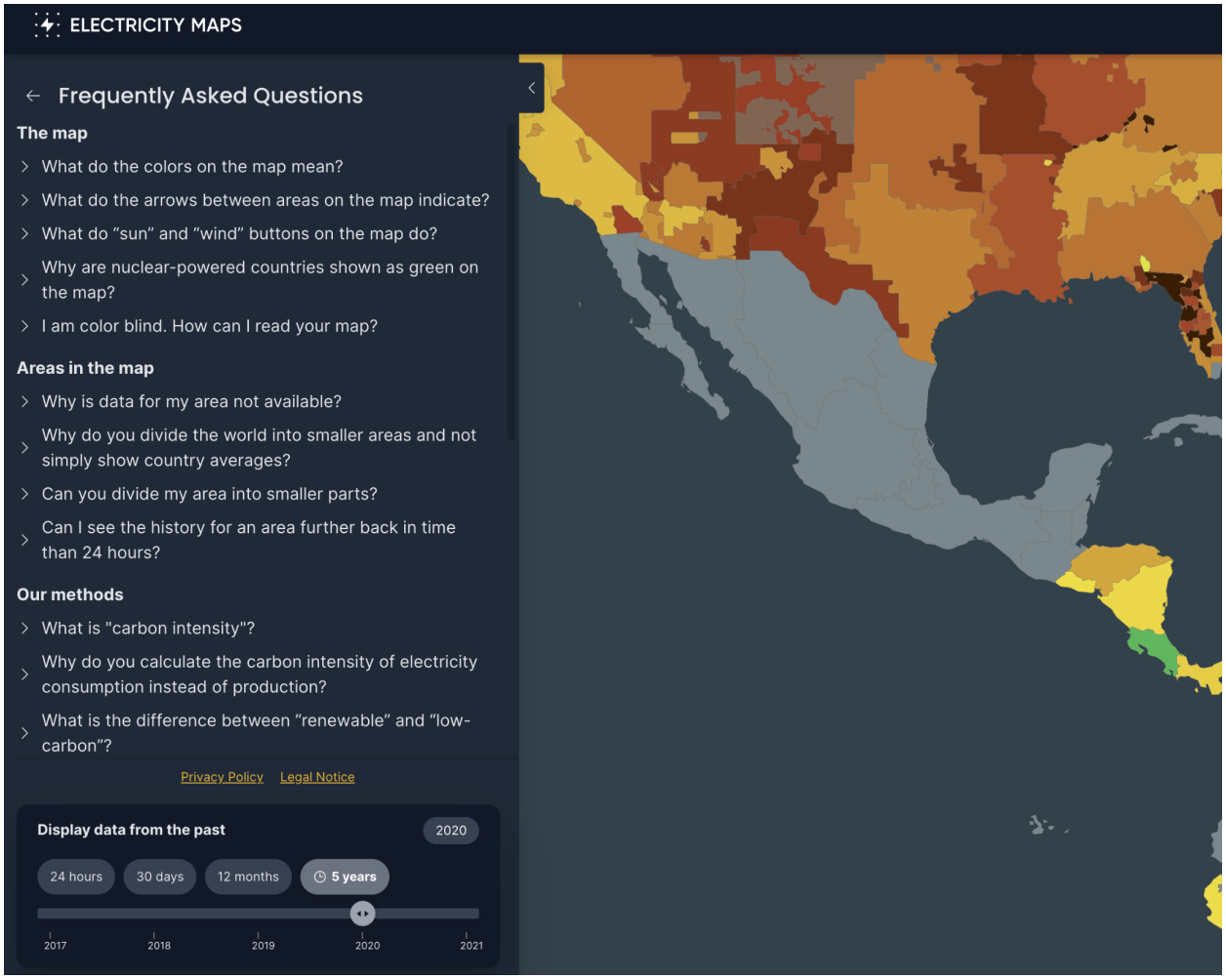

Figure 9. Screenshot of the FRQ section

Explanation: The heuristic that is being violated is #8 in Jakob Nielson's 10 Heuristics which is "Aesthetic and Minimalist Design " (Nielsen). A brief description of this heuristic is that the UI should not be cluttered with unnecessary information to the user. The reasoning for this violation is that the "Display data from the past" is constantly displayed even when navigating the FRQ section taking up unnecessary real estate on the panel.
Severity Rating: The severity rating I give this is a 3: "Minor usability problem: important to fix, so should be given high priority"(Nielsen). I gave it a severity rating of 3 because it's only a cosmetic design, but it does interrupt the user experience when viewing impacted areas of interest.
Suggestion for Fixing Heuristic Violation: My suggestion to remedy this problem is to implement a "Hide" button to hide the "Display data from the past " bar from the user and extend out the content on the panel for the FRQ.