

“V-Carbon”, Designing a World Co2 Emission Observation and Learning Mobile Application

Dongyi Zhao
Penn State Capstone Project 2022

Advisor: Guler, S. Ilgin



Agenda

- 01** Background
- 02** Objective
- 03** Methodology
- 04** Results
- 05** Reference



01 Background

Global situation

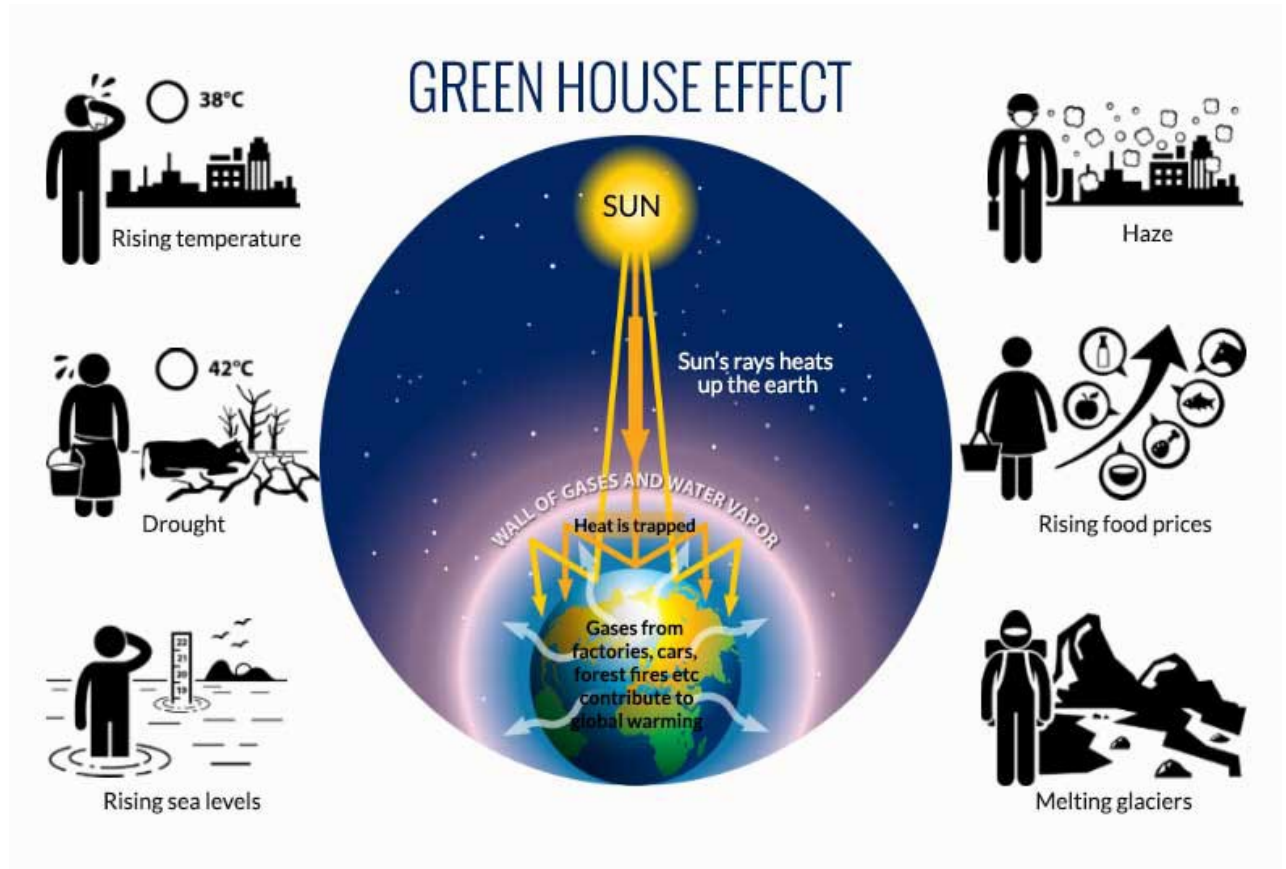
1) Greenhouse effect: Global climate warming, Glacial melting, Sea level rise, El Niño phenomenon, etc...

2) Ecosystem crisis

2) Rise in sea level

3) Natural disaster

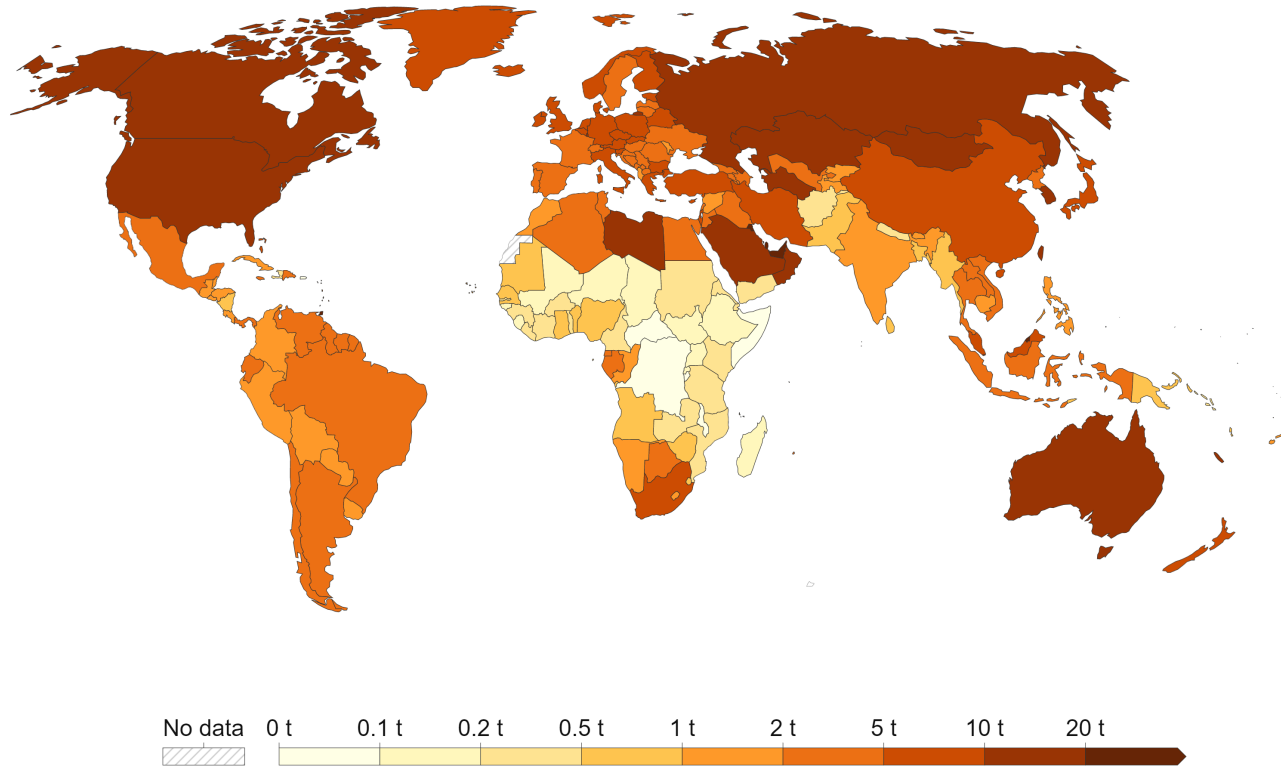
5) Desertification



Per capita CO₂ emissions, 2021

Carbon dioxide (CO₂) emissions from fossil fuels and industry¹. Land use change is not included.

Our World
in Data



The global carbon emissions generated by major electricity and heat production activities reached 13.98 billion tons, accounting for 41.7% of global carbon emissions in that year.

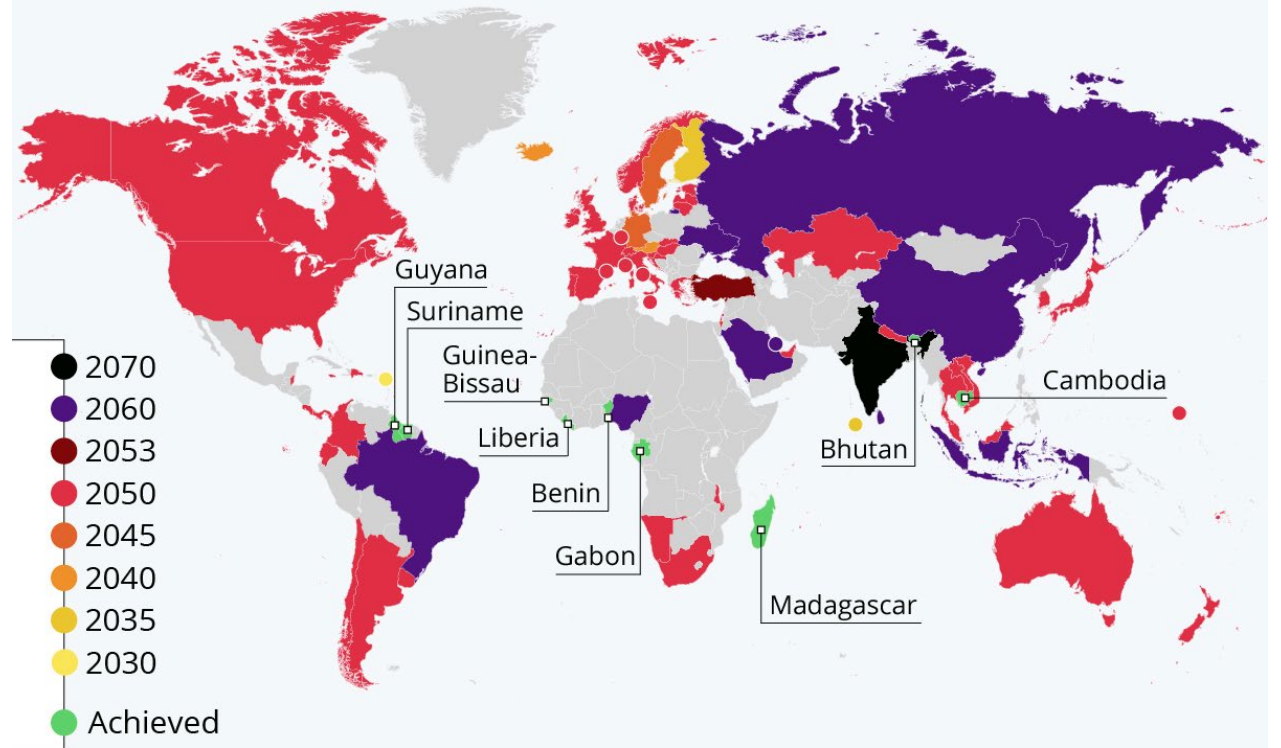
Source: Our World in Data based on the Global Carbon Project (2022) OurWorldInData.org/co2-and-other-greenhouse-gas-emissions/ • CC BY

1. Fossil emissions: Fossil emissions measure the quantity of carbon dioxide (CO₂) emitted from the burning of fossil fuels, and directly from industrial processes such as cement and steel production. Fossil CO₂ includes emissions from coal, oil, gas, flaring, cement, steel, and other industrial processes. Fossil emissions do not include land use change, deforestation, soils, or vegetation.

“Out of the 135 countries pledging carbon neutrality, only 66 have put a target year on their policies, laws or propositions according to data by Net Zero Tracker. ”

The Road to Net Zero

Countries with laws, policy documents or concrete timed pledges for carbon neutrality by target year



Source: Energy & Climate Intelligence Unit



Current Issues and challenges



Take urgent action to combat climate change and its impacts



An aerial view of disappearing ice at the summit of Mount Kilimanjaro in the United Republic of Tanzania.

© UN Photo/Mark Garten

- greenhouse gas emissions will continue to increase without critical steps to shift economies towards carbon neutrality

02 Objectives

The primary goals and objectives of this project include the design, build-out, and testing of a user-friendly mobile application that will enable to :

- a. Query, visualize, and report the effective carbon emissions status of each country and region.
- b. Identify, compare and analyze the performance of carbon emissions for each area.
- c. Allow users to receive essential messages related to co2 emissions and take action.



03 Methodology

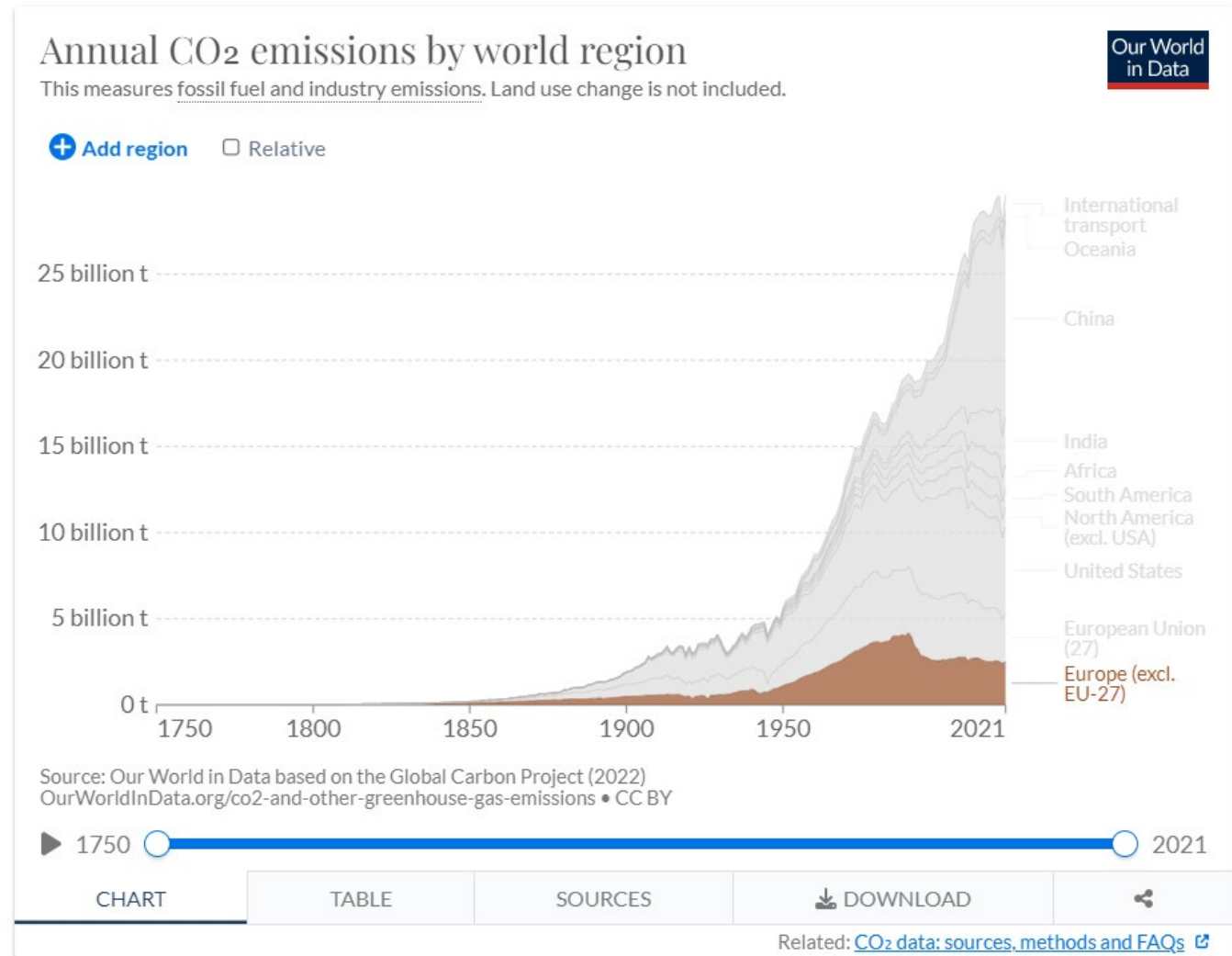
DATA

1) Our World In Data

2) World Bank

3) Carbon Monitor

4) Climate Watch



“Our World in Data”

The image shows the homepage of the 'Our World in Data' website. The header is dark blue with the logo 'Our World in Data' on the left. To the right of the logo is a navigation menu with 'Articles by topic' (highlighted with a white border), a search bar with 'Search...' text, and links for 'Latest', 'About', and 'Donate'. Below the search bar are links for 'All charts' and 'Sustainable Development Goals Tracker'. A yellow banner across the middle contains the text 'COVID-19 vaccinations, cases, excess mortality, and much more' and a button labeled 'Explore our COVID-19 data'. The main content area has a dark blue background with a faint world map. It features the headline 'Research and data to make progress against the world's largest problems' in yellow. Below this is a button with a yellow border labeled 'Scroll to all of our topics' with a downward arrow. At the bottom, it states '3343 charts across 297 topics' and 'All free: open access and open source'.

Our World in Data

Articles by topic

Search...

Latest About Donate

All charts Sustainable Development Goals Tracker

COVID-19 vaccinations, cases, excess mortality, and much more

Explore our COVID-19 data

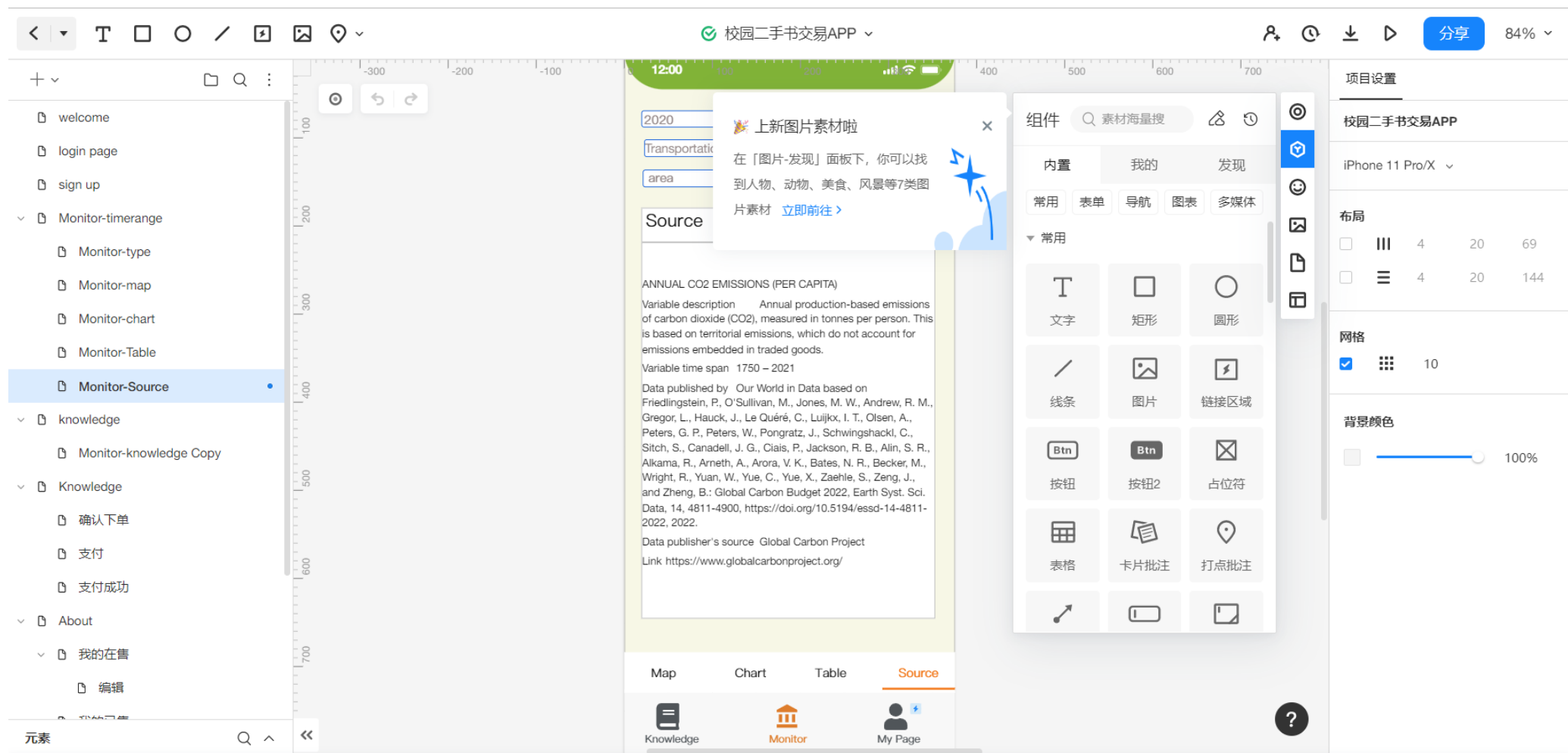
Research and data to make progress against the world's largest problems

Scroll to all of our topics

3343 charts across 297 topics

All free: open access and open source

Prototyping platform: “MODOU”



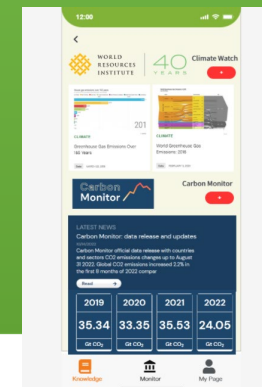
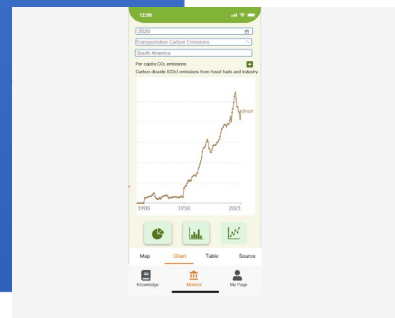
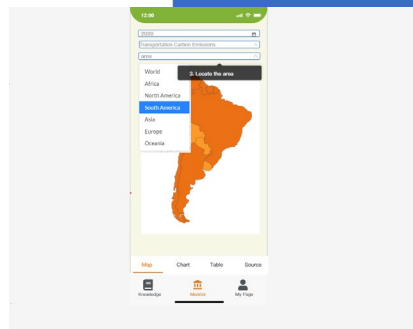
04 Results

Observe, learn and interact

Application

Data Observation

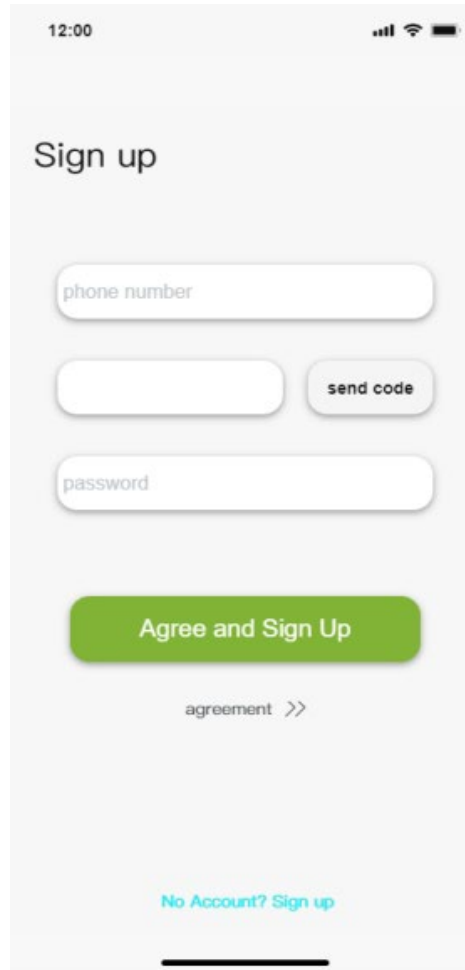
Knowledge Graph



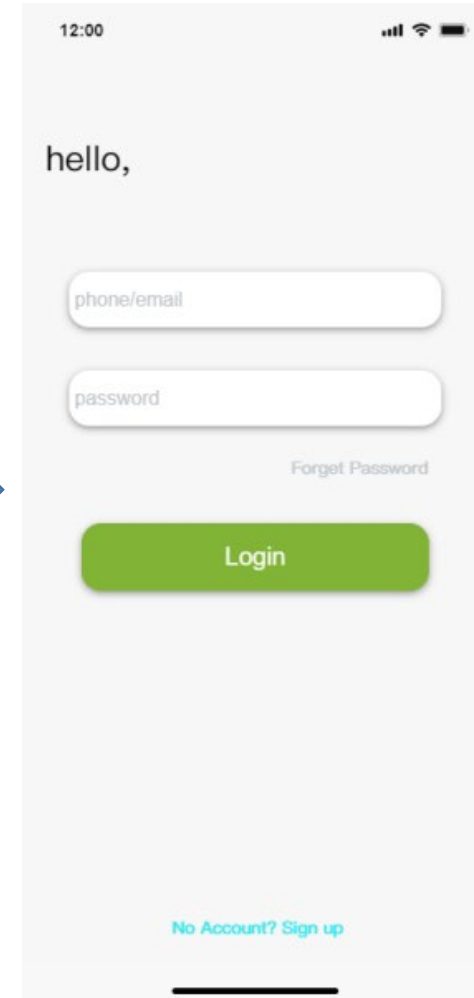
Welcom, Login Page, and Registration



welcome page

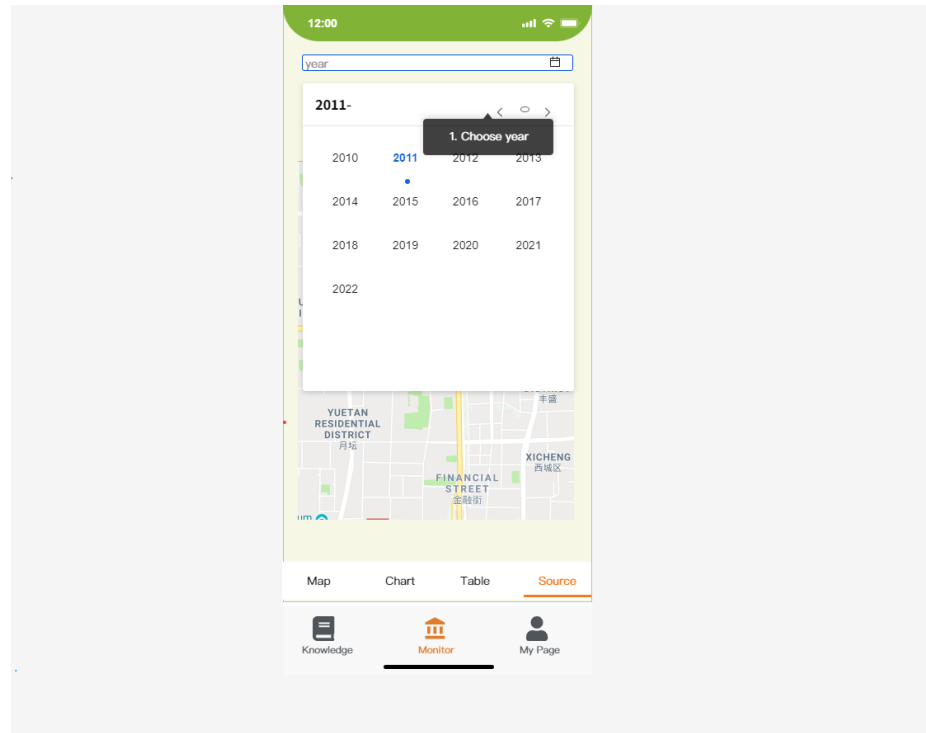


Sign up Page

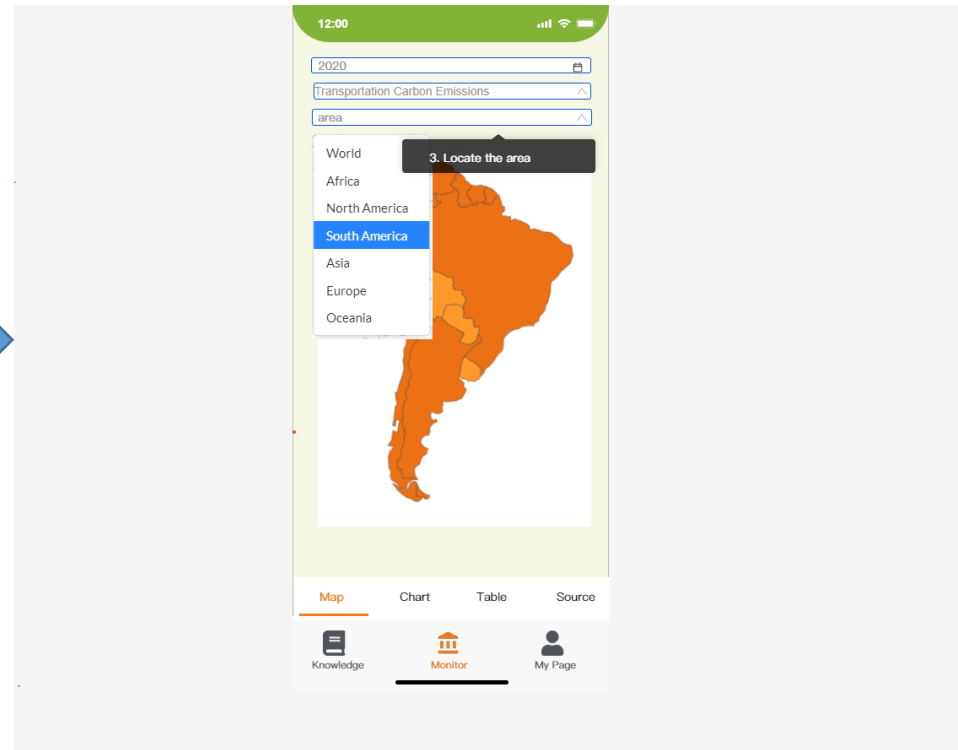


Login Page

Data Observation-Define the categories

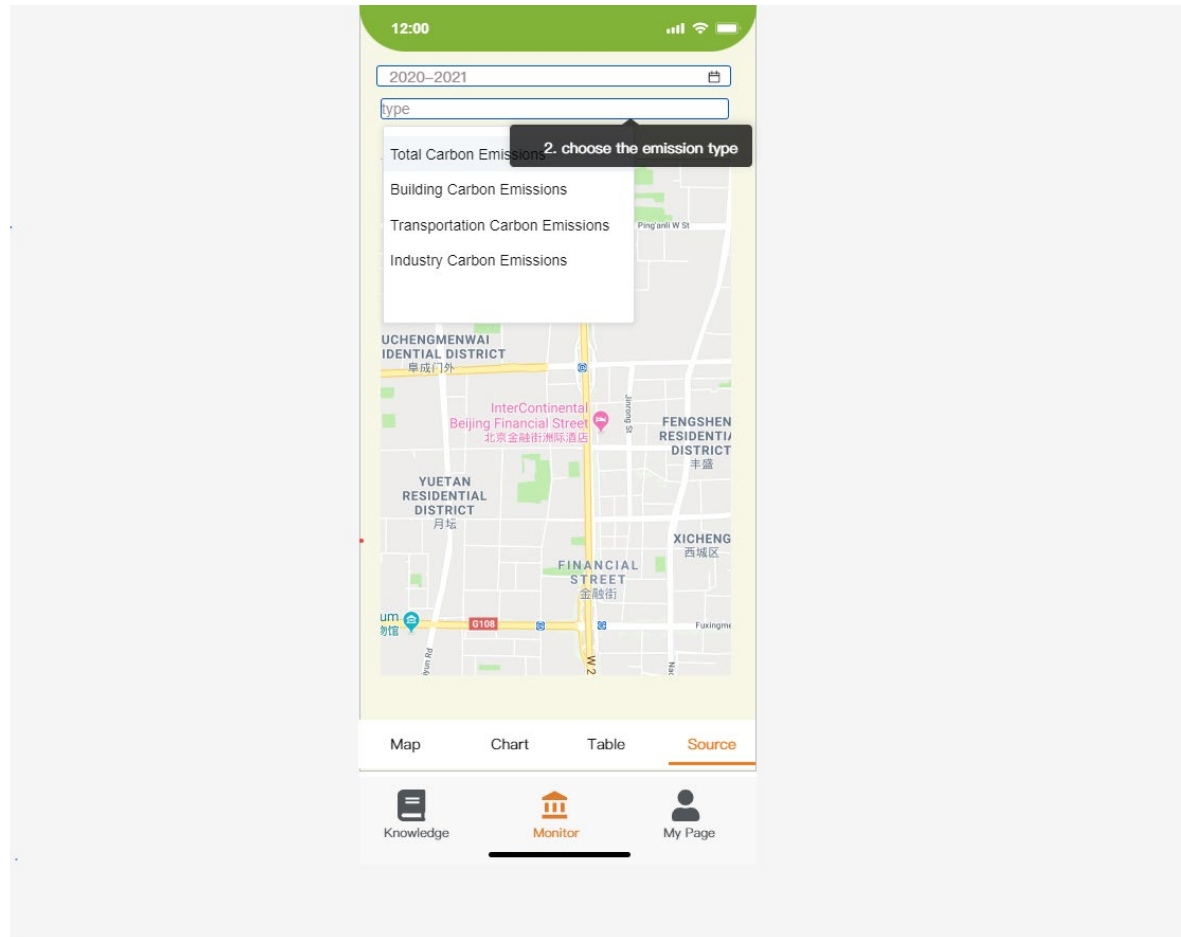


Define the Year



Define the Region

Data Observation-Define the categories

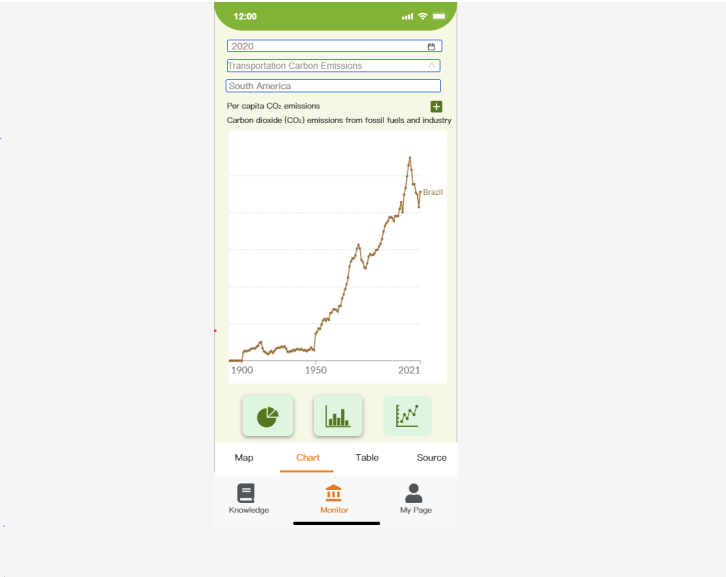


Define the Categories by:

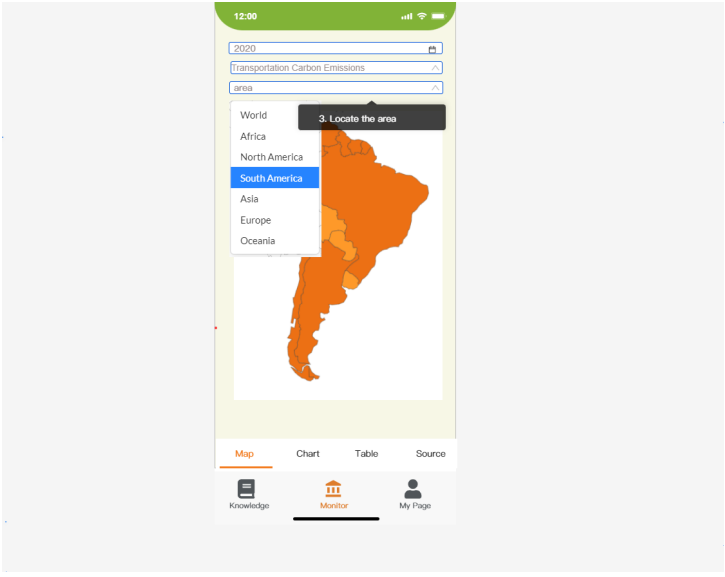
- Building Carbon Emissions
- Transportation Emissions
- Industry Carbon Emissions

Data Observation-Data Analysis

Finish the Categories selection



Chart

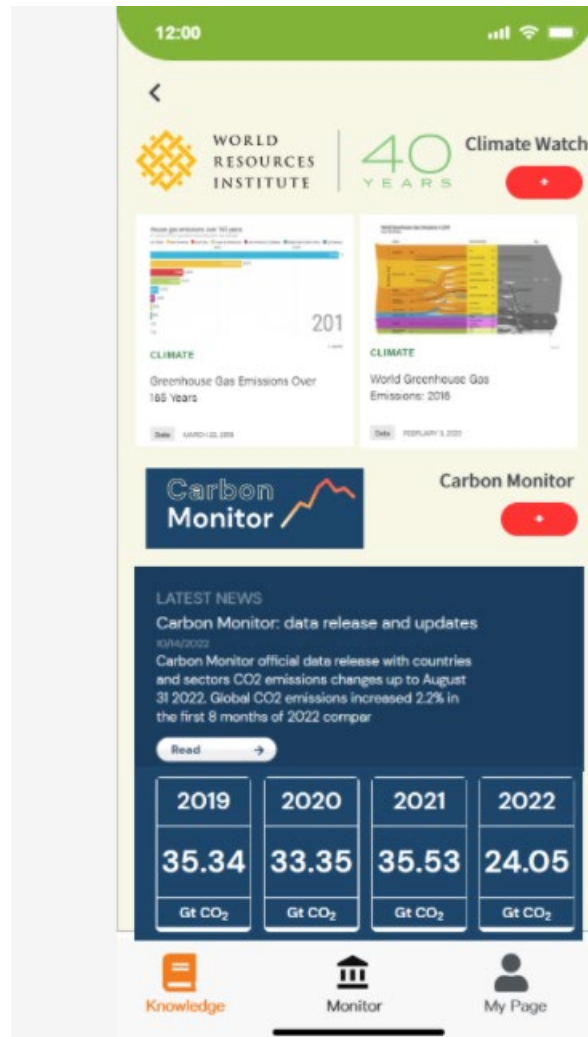


Map

Country	1950	2021	Absolute Change
Algeria	0.001	0.301	+0.301
Algeria	0.001	1.041	+1.041
Algeria	0.001	1.021	+1.021
Algeria	0.001	3.991	+3.991
Algeria	0.001	5.731	+5.731
Algeria	0.001	5.621	+5.621
Algeria	0.001	9.171	+9.171
Algeria and Barbados	0.001	5.031	+5.031
Algeria	0.001	4.121	+4.121
Algeria	0.001	2.441	+2.441
Algeria	0.001	0.051	+0.051
Algeria	0.001	6.621	+6.621
Algeria	0.001	4.041	+4.041
Algeria	0.001	15.091	+15.091
Algeria	0.001	1.241	+1.241
Algeria	0.001	3.731	+3.731

Table

Knowledge Module



Global Carbon Project

The Global Carbon Project (GCP) is an organisation that seeks to quantify global greenhouse gas emissions and their causes. Established in 2001, its projects include global budgets for three dominant ...

globalcarbonproject.org

International Energy Agency

Intergovernmental organization

The International Energy Agency (IEA; French: Agence internationale de l'énergie) is a Paris-based autonomous intergovernmental organisation established in the framework of the Organisation for Econom...

About - Carbon Monitor

<https://www.carbonmonitor.org.cn/about/>

Carbon Monitor is an international initiative leveraging the efforts of ten research groups to provide for the first time regularly updated, science-based estimates of daily CO₂ emissions in different countries. The data reveal the drop and re-growth of CO₂ emissions during the COVID-19 pandemics.

Similar search: [how to monitor carbon dioxide](#)

Feedback

Carbon Dioxide Information Analysis Center (CDIAC)

<https://cdiac.ess-dive.lbl.gov/home.html>

2017-9-11 · Carbon Dioxide Information Analysis Center **ESS-DIVE** CDIAC Data Transition . The Carbon Dioxide Information Analysis Center (CDIAC), located at the U.S. Department of Energy...

Conclusion

Low carbon economy aims to obtain more economic output based on less consumption of natural resources and environmental pollution, thus achieving higher standards of living and better quality of living.

——White Paper *Our Energy Future: Creating a Low Carbon Economy* by the British government in 2003.

05 Reference

Department of Trade and Industry. (2003). Our energy future - creating a low carbon economy. GOV.UK.

<https://www.gov.uk/government/publications/our-energy-future-creating-a-low-carbon-economy>

W.W.F.C.H.I.N.A. (2011). Low Carbon City Initiative (LCCI). WWF China.

https://en.wwfchina.org/en/what_we_do/climate_energy/mitigation/lcci/

LOW-CARBON CITIES | Guide to Chinese Climate Policy. (n.d.). The Climate Group.

<https://global.sjtu.edu.cn/en/page/sub/339>

Sustainable Development. Goal 11 | Department of Economic and Social Affairs. (2015). United Nation.

<https://education.nationalgeographic.org/resource/sustainable-development-goal-11-sustainable-cities-and-communities>

CO2 emissions. (2020, May 11). Our World in Data.

<https://ourworldindata.org/co2-emissions>

Global Energy Review: CO2 Emissions in 2021 – Analysis. (n.d.). IEA. <https://www.iea.org/reports/global-energy-review-co2-emissions-in-2021-2>

...

T H A N K S

