Data Challenge

Renewable Energy

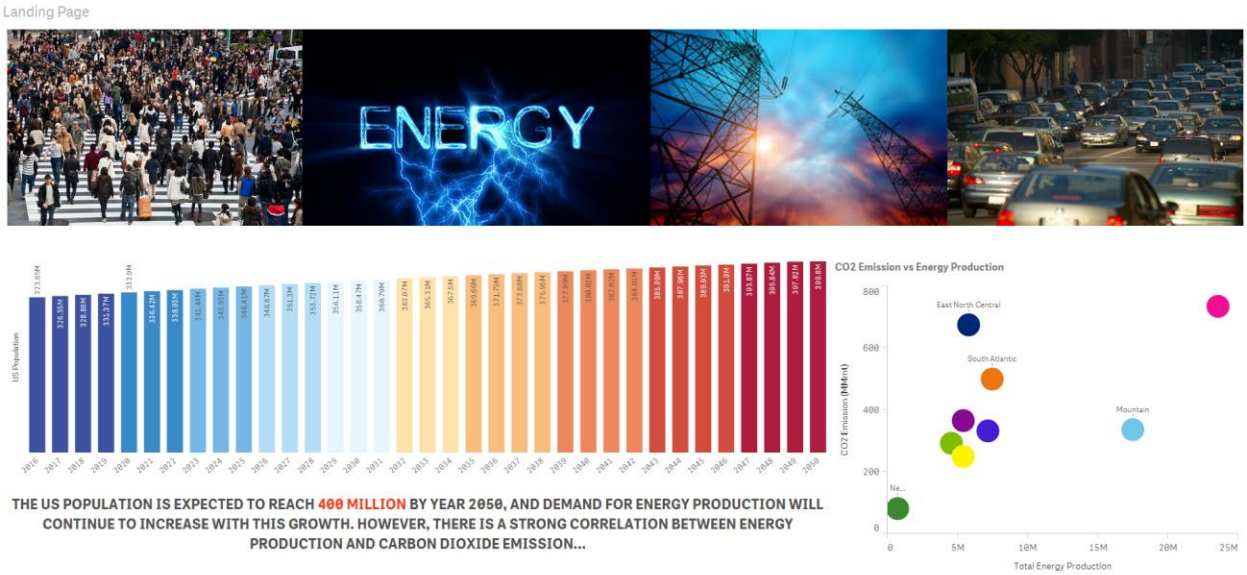
Introduction

If humanity continues to pollute as much as we do today, what will happen to the world as we know it? Since the US population is expected to reach 400 million by the year 2050, what is a high-impact way to reduce climate change? The solution is through renewable energy sources, such as solar energy.

This app is intended for environmentally conscious individuals who wish to explore the positive effects of renewable energy adoption. Using a blend of various publicly available data sources, we can identify unique trends with the amount of human-related carbon emissions and their correlated global effects. With the following Qlik Sense dashboard, our team has organized these main classifications into four main modules:

1. Carbon Emissions and Air Pollution
2. Energy Cost and Production
3. Renewable Energy Details
4. "What-If" Analysis

Landing Page



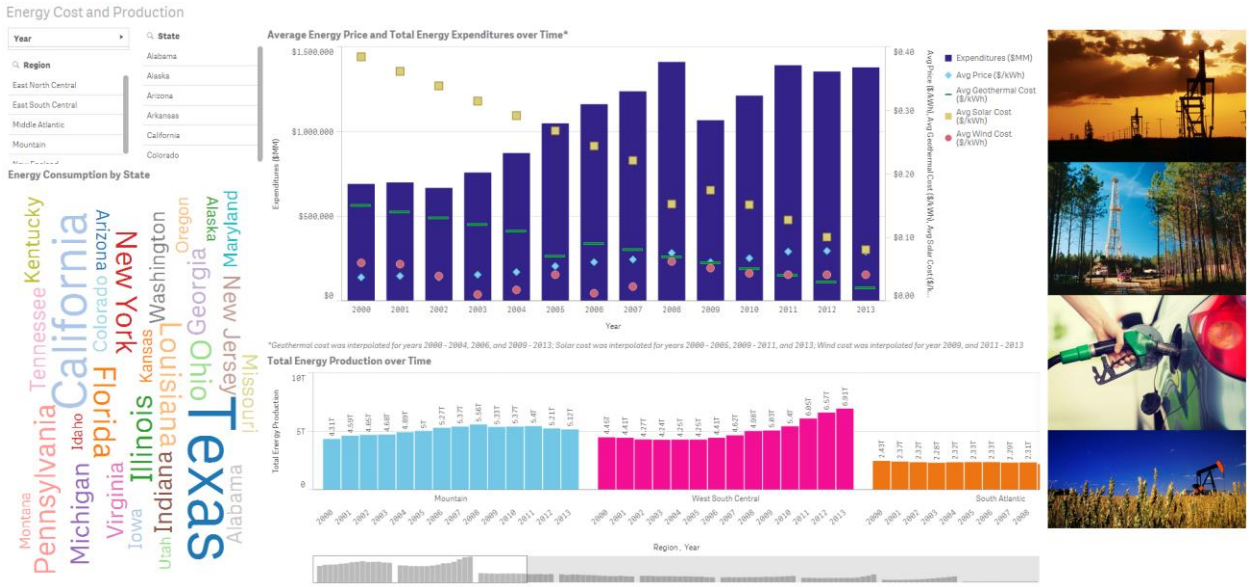
The Landing Page demonstrates the effects of Population Growth Forecasts with Total Energy Production vs. CO_2 emissions. Click on one or more column(s) or scatterplot point(s) to apply a filter.

Module 1

Using Module 1, we are able to see the effects of emissions from CO_2-related energy sources. The Energy-Related CO2 Emission (MMmt), % Renewable of Energy Usage by Region and Air Pollution (µg/m3), % Renewable of Total Energy Usage by State scatterplots show a trend between lower carbon emissions with a higher percentage of solar energy adoption by state or region. For example, the Pacific region has a lower carbon footprint in comparison to other regions, likely due to high adoption of renewable energy sources.

We can also see that traditional energy sources have comparable figures across sectors in the Energy-Related CO_2 Emission by Source and Region graph by applying various Sector filters at the top of the dashboard—this suggests that all sectors could see reductions in CO_2 emissions by prioritizing use of solar energy. In addition, we can see that Electricity & Natural Gas are major sources of CO_2 emissions.

Module 2

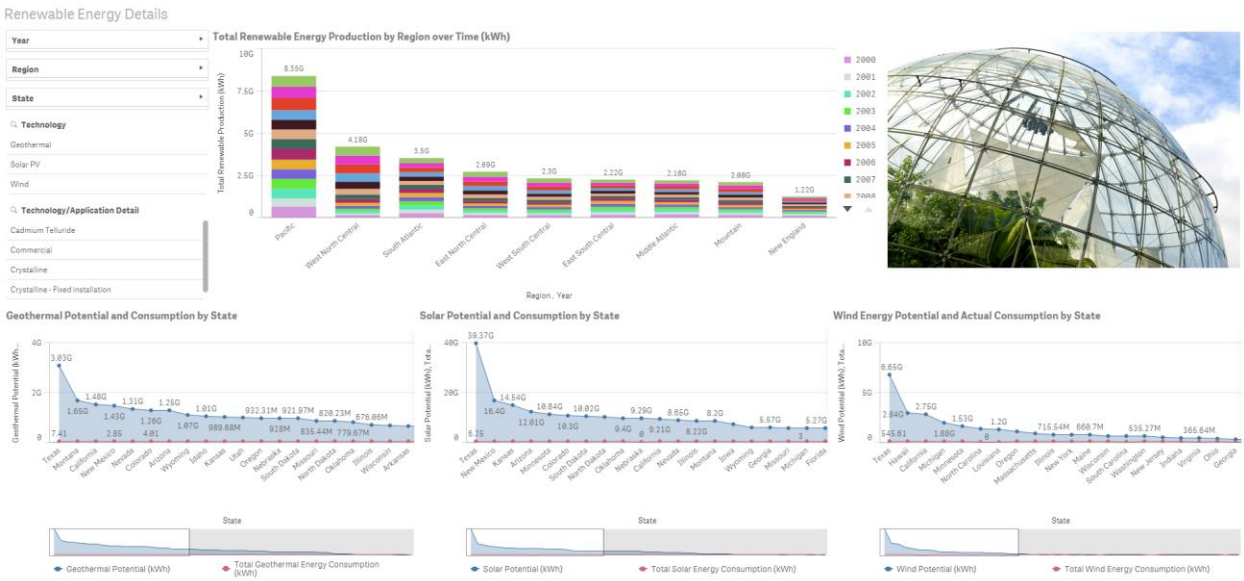


In Module 2, energy costs and production quantities are detailed. With the Average Energy Price and Total Energy Expenditures over Time graph, we can observe that overall energy expenditures are increasing, while the average price for renewable energy has decreased. Despite this cost decrease, many states still have low renewable energy adoption levels, which may show an opportunity for investment.

In the Energy Consumption by State word cloud, the amount of energy consumption relates to the size of the state—the more energy consumed, the larger the text size.

Total Energy Production over Time depicts regional energy production trends across the United States.

Module 3



Module 3 provides additional detail about renewable energy.

The Total Renewable Energy Production by Region over Time (kWh) column graphs show how much renewable energy was produced on a yearly basis across the United States. The filters to the left of this module provide additional context for filtering and data exploration.

The line/area graphs at the bottom of the dashboard demonstrate potential vs. actual consumption of Geothermal, Solar, and Wind Energy by State. As we can see by the large gap, there is significant opportunity for renewable energy adoption.

Module 4

Module 4 allows us to conduct “What If?” analysis to see the effects of a reduced carbon footprint.

With a footprint reduction of even 10%, carbon emissions are significantly reduced for future years in both the Forecasted Energy Consumption, Production and CO_2 Emission and Renewable Energy Production vs. CO_2 Emission graphs.

Conclusion

The scientific community has found “unequivocal … evidence” that human-related activities are drastically affecting climate conditions. Using the insights we have found from energy data, the solution is clear—it’s time to go solar!