Global Power Generation

Summary

Global power generation dataset was includes power generation between 2013 and 2016 for over 164 countries around the world. Power generation is in GWh(Gigawatt hours). 1GWh - 1000000000wh .It explores regions with high power generations and reveals North America and the Asia Pacific are the top producers of energy. The main sources used to generate electricity are Coal, Hydro, Gas, and Nuclear moreover it tries to explore the top countries utilizing each fuel. The USA, India are the top producers of power. It further explores the inclination of the world using fossil fuels, beyond 65% of global power generation utilizes fossil fuels. However, fossil fuels release carbon dioxide when they are burn which adds to the greenhouse effect and increases the Global warming, In contrast, renewable energy sources produce little to no global warming emissions. But only ⅓ rd of electricity is generated by renewable energy sources.

Initial version of tableau story can be found here

https://public.tableau.com/profile/pooja7429#!/vizhome/GlobalPowerPlant/Globalpowerplant?publish=yes

Intermediate version of tableau story can be found here

https://public.tableau.com/profile/pooja7429#!/vizhome/powergeneration/Powergeneration?publish=yes

Final version of tableau story can be found here

https://public.tableau.com/profile/pooja7429#!/vizhome/powergeneration_v3/Powergeneration?publish=yes

Data:

The Global Power Plant Database is a comprehensive, open source database of power plants around the world. Each power plant is geolocated and entries contain information on plant capacity, generation, ownership, and fuel type starting from 2013 to 2016. The database includes around 28,500 power plants from 164 countries

Dataset had to be cleaned on the following aspects:

Quality:

1. country column has abbreviated names of countries.
2. Fuel information was divided in of 4 columns (fuel1, fuel2, fuel3, fuel4) of which fuel2, fuel3 ,fuel4 has null values more than 90%

Tidiness:

1. melt columns generation_gwh_2013, generation_gwh_2014, generation_gwh_2015, generation_gwh_2016 .

This process is well documented in the attached Jupyter notebook Global_power_generation_wrangling.ipynb

Design:

Global power generation: A short summary is provided to acquaint the audience with the dataset and terms used in it included in version 3.

Power generation by Region: Geographic data, is the main feature of chosen dataset so the map visualization shading by total power generation seemed most appropriate. In the first version of the story I had created a map for countries in the world but made changes following the feedback as it wasn't effective delivering the intended message. So in the next version, I created groups of regions such as North America, Asia Pacific, Africa etc. to show their overall power generation and shaded them by total power generation.

What are the fuels used to generate electricity?: This is bar chart illustrating fuels consumption among the world. Viewers have control to hover over to view top countries producing power from the each fuel. Additional feature included in version 2.

Fuel consumption in power generating countries: It is a tree map added in version 2. It shows top 10 countries in power generation. Users have control to hover over each country to learn the fuels most likely used to generate power.

Heavy dependency on fossil fuels: This is a dashboard including a bar chart, a line graph and a pie chart . It shades some light on how world is inclined to fossil fuels. Over 65% power is generated using fossil fuels. Interestingly africa produces more than 50% of its energy using renewable sources and south america isn't far behind.

Feedback

A user from Slack community

1. first slide: the text box is over part of the visualization, but more importantly, consider using a bar graph instead of the circles. The class said that area is hard to compare. Also, the smallest circles don't have labels unless I put my cursor over them.
2. Second slide: the US and China stand out well, but India blends in with the rest of the world (its shade of gray isn't that noticeable) despite it being in the top 3 as stated in the text box. Maybe a different color scheme than black and white would highlight India more?
3. On the next slide, I'm not sure what the percentage means. For example, in 2015, what is 22% of total generation?
4. Blackout Countries: The text box is about low power generation countries, but on the map the US and India stand out. The rest of the world is similar shades of gray. The text tells me that most of the low power generating countries are in Asia, the Middle East, Africa, and Europe, but these regions are indistinguishable from South America and Australia. And wasn't China the third largest energy producer, but now they're not highlighted on this map? The two line graphs don't really tell me anything. The blue one contains 135 countries and the gray is listed as other. I'm not getting a clear picture of which countries are low power generating and which ones are high. Maybe group countries based on levels and color those levels on the map? Such as increments of 100,000 Gwh?
5. I like the fuel options slide. It very clearly delivers the message that the world relies on coal.
6. On the renewables slide, maybe move the text box to the white space above biomass.ide, I don't think the map is necessary. The bar graphs do a great job

conveying the message. Removing the map would give you more space on the slide. Also, the text you have over the map can go in the text box above on the carousel.

Udacity Mentor

1. First slide: I think you should get rid of the annotation and make that your caption instead. 'Introduction' is not a useful caption. I think it is also really important to introduce the two main measurements. What is Mw and what is Gwh? What is your bubble. chart illustrating exactly? A chart title is always appropriate
2. Slide 2 :There is no need for a country filter since the whole world is visible. You could filter by power plant type instead. I would have two separate slides - one for capacity and one for power generation. They can be set up similarly.
3. Slide 3: This graph is a little unusual. You typically would not have a percent of row then display it as a line graph. I think you should just have the raw numbers instead. Maybe the % could be displayed when hovering.
4. Slide 4: The map chart is too skewed to distinguish high vs medium vs low generating countries. Maybe use the logarithm of number instead
5. Slide 5: Once again the filter is not useful when that is the independent variable for most of the charts.

Feedback was very helpful to me, I realized I completely failed in delivering the story. So, I started watching videos on tableau , took another course online to make story informative and logical. Here’s the feedback I received for second version of the story.

Udacity Mentor:

much improved! I would just add a little bit more to your first caption. Include a little summary about what this dataset is and the questions you want to answer - something similar to your summary in your write-up. You should also spell out what Gwh stands for (at least the first time)

A user from slack community

On the second to last slide, "Fuel consumption among high power generating countries", consider a bar graph as it's difficult to visually compare some of the countries, such as Germany and China or Russia, Italy, and Canada. I like the hover over each country though. That's really informative. On the last slide, move the text box to the white space on the right. Otherwise, I think that final slide does a great job illustrating renewables vs. fossil fuel use. I found it interesting that Africa generates more than 50% of its power from renewables and South America isn't far behind.

Reflection

Overall the dataset I selected was easy to wrangle and it was a great learning process of exploring and visualizing. I am surely going to continue with my journey in tableau.

Future revision of this project will include:

- What are those high power consuming countries?
- Does countries with high power generation are able to fulfill the consumption need?
- What percentage of Co2 releases from fossil fuels?
- How does the cost of power generation varies with fossil fuels and renewable sources?
- What are available jobs in these industry?

Resources

Wri.org

Online tableau course