

The purpose of visualisation
is insight, not pictures.

- Ben Shneiderman

Milestone One

Tutorial Group P2-04

Visual #1

All the World's Emission in One Chart

- Infographic by VisualCapitalist



Introduction

- Designed by VisualCapitalist for explanatory analysis
- Features a treemap shaped like a “globe”
- Highlights top "heavy hitters" countries (collectively contributes approx. 50%)



Data

- **Data Types:**
 - Country Name (Nominal)
 - Carbon Emissions in % (Ratio)
- Each segment represents one of the top 30 highest producers of carbon emissions



Task

- Illustrate where most of the world's carbon emissions originate from
- Allow comparative viewing of the country's carbon emissions



Good idioms

- Country names are prominently displayed next to their % data
- Segment sizes are directly proportional to carbon emissions %
- Effectual use of the colour channels to denote shares of carbon emissions



Bad idioms

- “Incomplete” legend used (**Pink** is omitted / **Light Grey** (0%) have higher % than **Pink** segments)
- Inconsistent colour scale (e.g., South Korea)
- Size Distortion (e.g., different sizes for Ukraine, U.A.E, Egypt, Argentina & Vietnam)
- Segments were neither grouped by region nor by their carbon emissions %



Bad idioms

- Information on the number (count) of countries represented is not available
- No standardisation of font style (e.g., [Malaysia](#))
- No list of countries is provided to allow easy identification of all the countries represented
- Error in Unit of Measure of “Metric Tons of Carbon Dioxide” – the correct unit of measure is “MTCO₂e”



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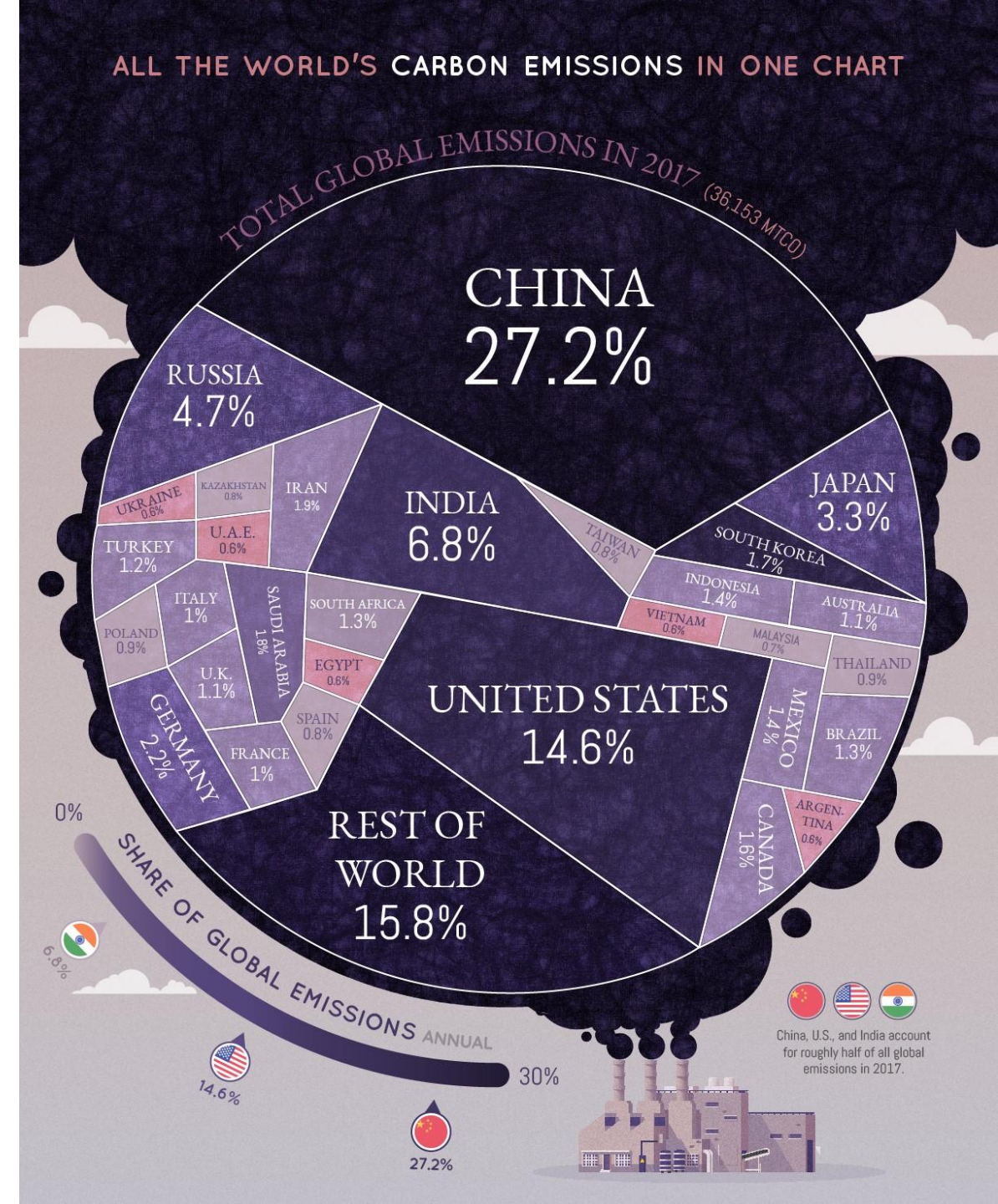


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Design Violations

- Law of Proximity
- Law of Similarity
- Law of Common Region
- Law of Prägnanz (Simplicity Law)



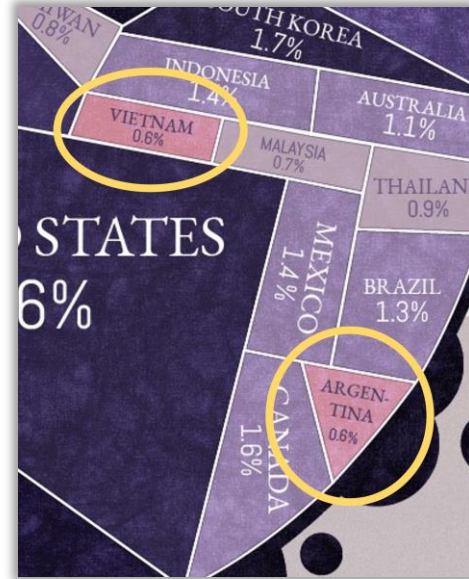
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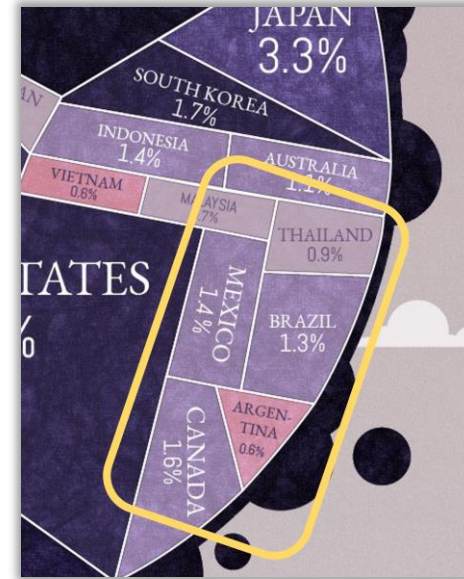
Law of Proximity

Skewed representation. Adjacent segments do not correlate with each other



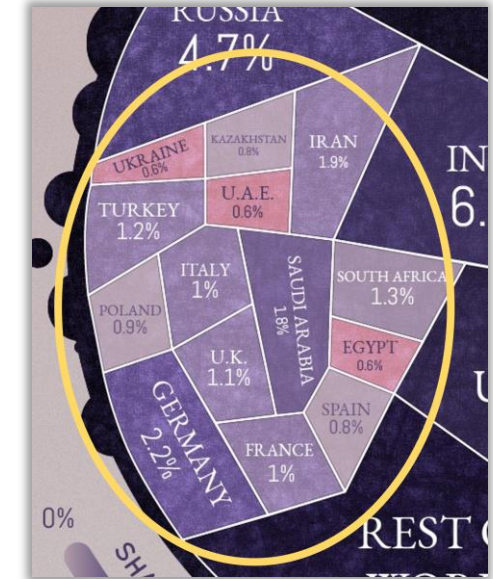
Law of Similarity

Segments with identical percentages look completely different from each other



Law of Common Region

Segments are neither grouped by volume nor by their geographical location



Law of Prägnanz

Complex shapes and sizes make it difficult to interpret the percentages.

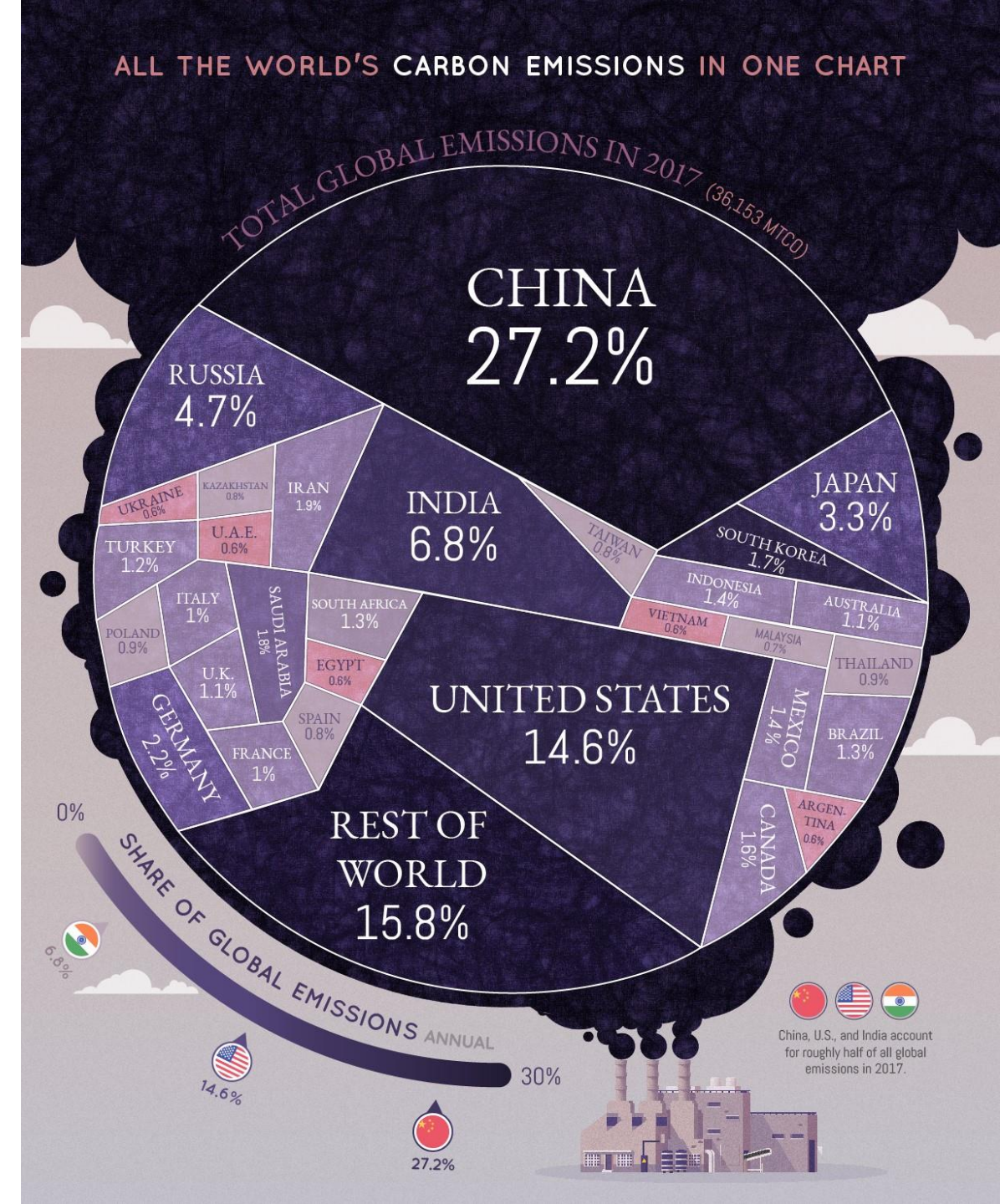
Proposed Improvements

- Use bar graphs or pie charts to better accentuate the differences
- Standardise the font styles and country name representations (United States vs U.K. & U.A.E.)
- Position the names of the countries upwards
- Include all colours utilised in the chart legend

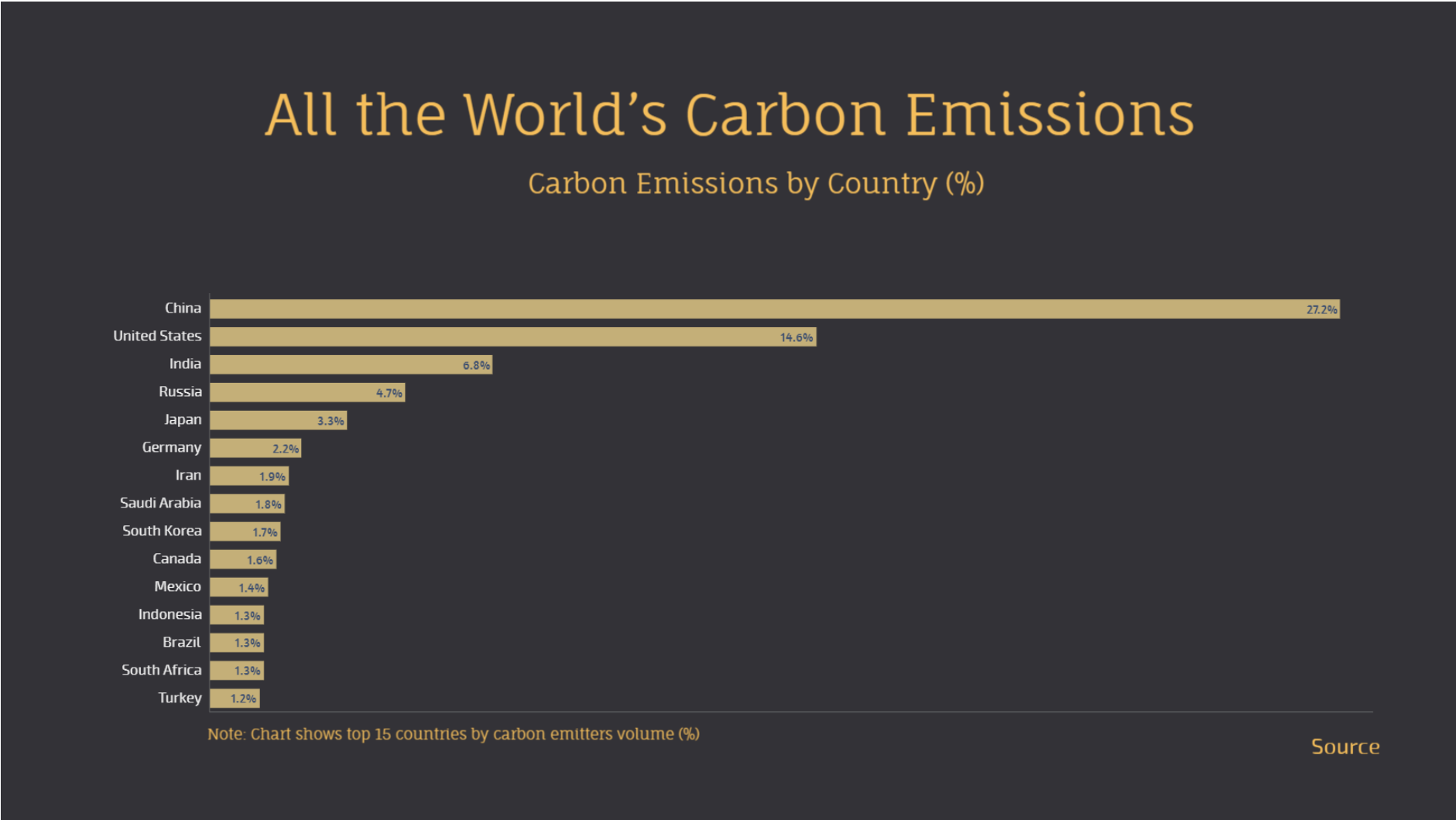


Proposed Improvements

- Group the countries by their similarities. (e.g., by region, by carbon emissions (%), etc.)
- Indicate the total number of countries represented in the infographic
- Removal of the "Rest of the World" to further highlight top countries with carbon emission



Proposed Revised Graph





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Visual #2

Which Countries Have the Worst Air Pollution?

- Infographic by Matt Dzugan

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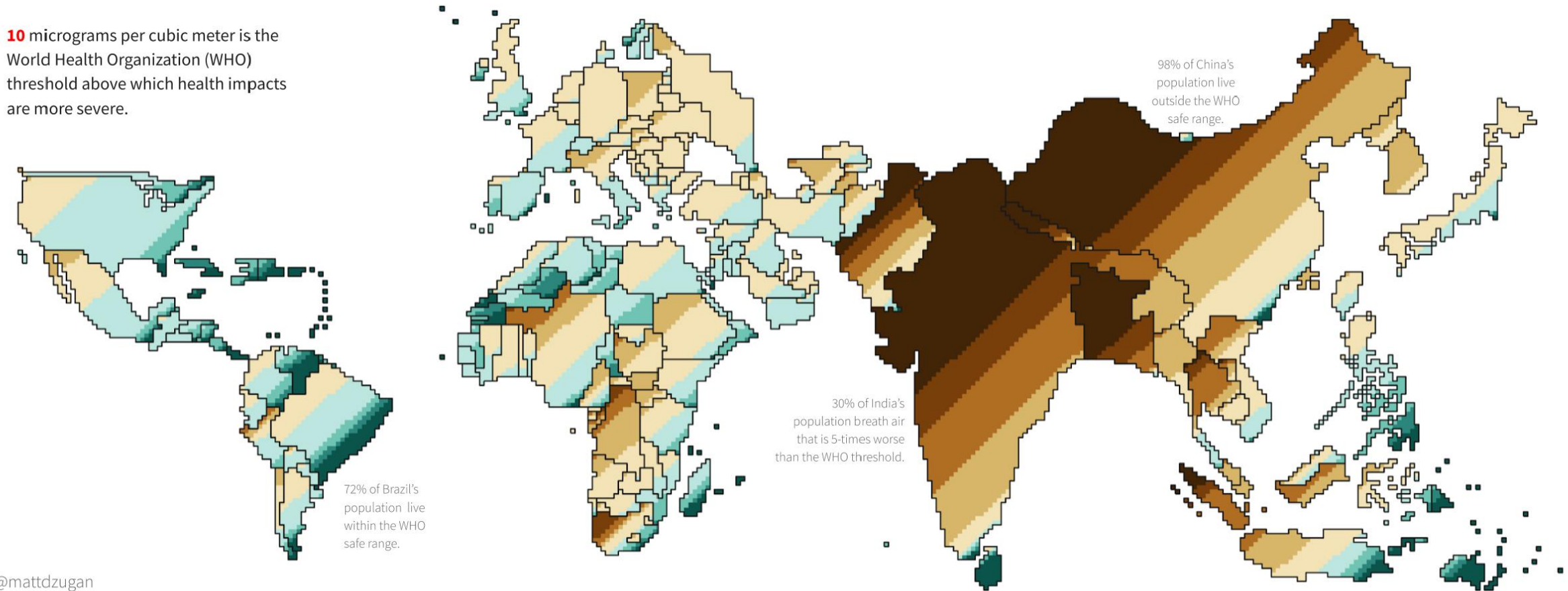
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Countries are resized according to their population to represent **people** rather than **land**

Fine Particulate Matter (PM2.5) Concentration with Dust and Sea-Salt Removed

0 2.5 3.3 5 **10** 20 30 40 50
micrograms per cubic meter

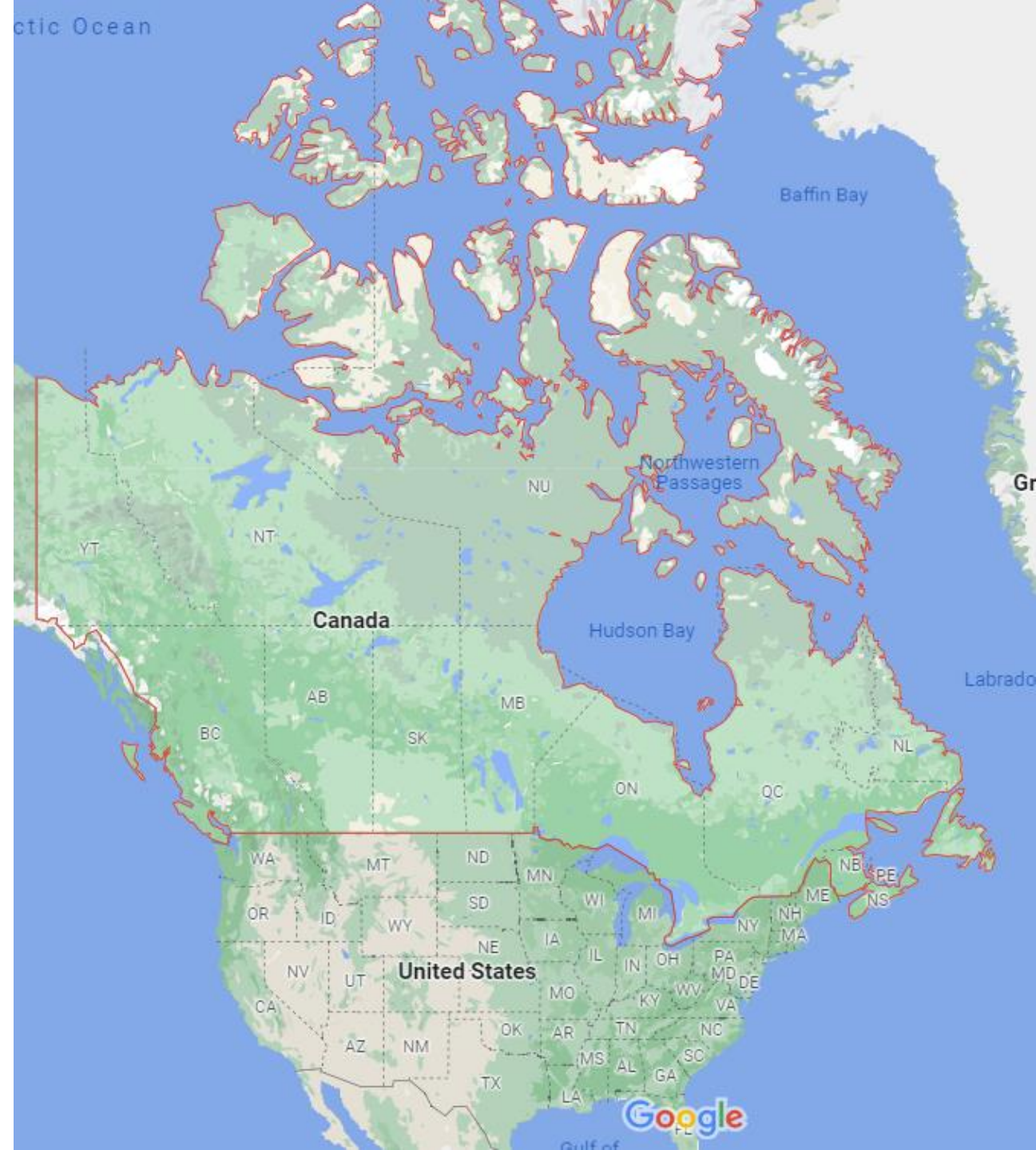
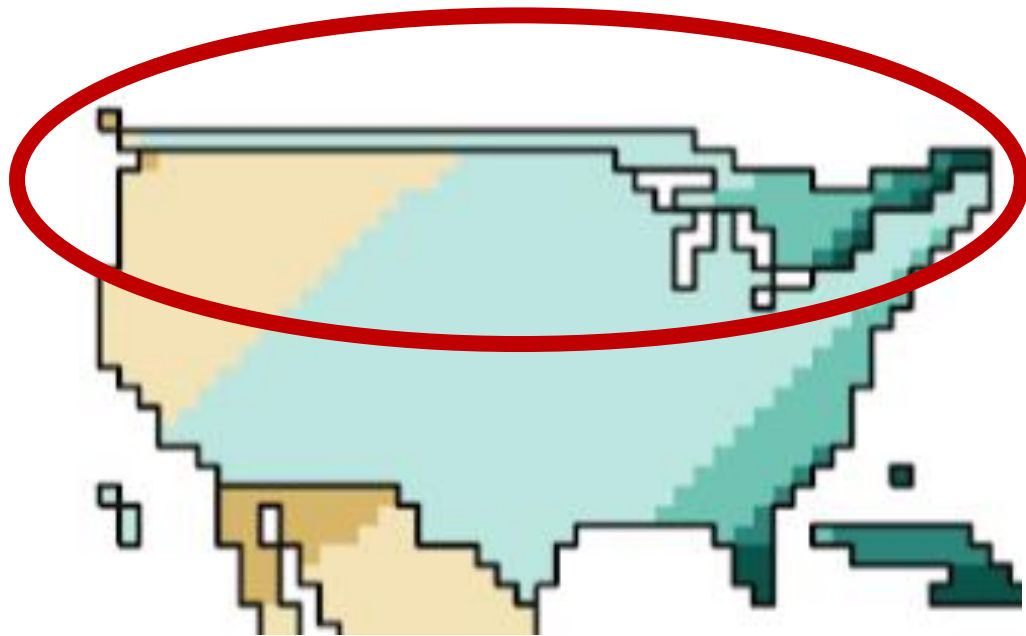
10 micrograms per cubic meter is the World Health Organization (WHO) threshold above which health impacts are more severe.



@mattdzuan

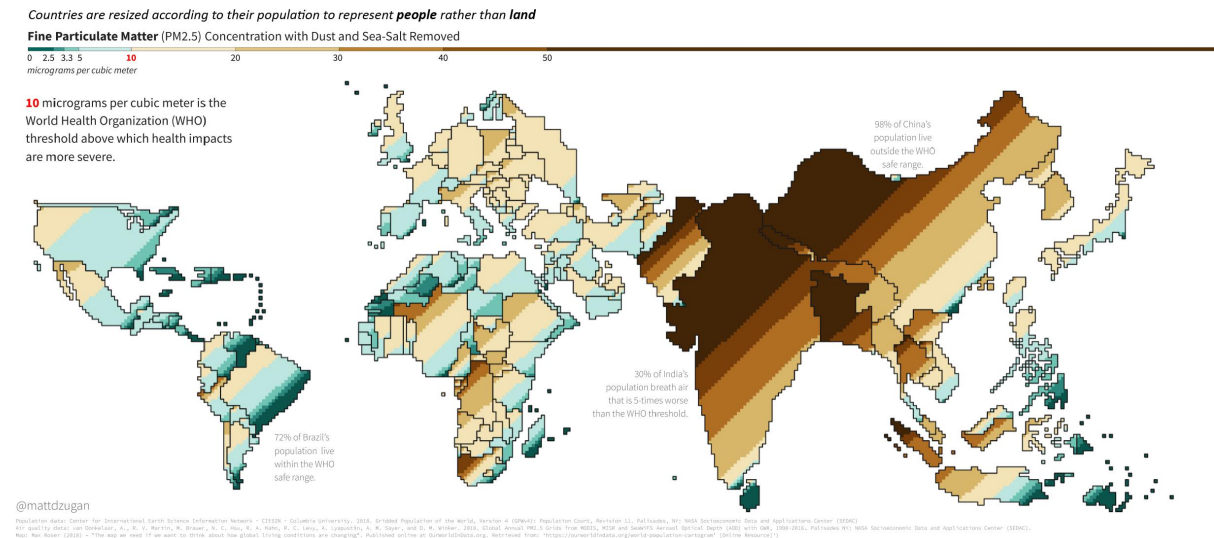
Population data: Center for International Earth Science Information Network - CIESIN - Columbia University. 2018. Gridded Population of the World, Version 4 (GPWv4): Population Count, Revision 11. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC)
Air quality data: van Donkelaar, A., R. V. Martin, M. Brauer, N. C. Hsu, R. A. Kahn, R. C. Levy, A. Lyapustin, A. M. Sayer, and D. M. Winker. 2018. Global Annual PM2.5 Grids from MODIS, MISR and SeaWiFS Aerosol Optical Depth (AOD) with GWR, 1998-2016. Palisades NY: NASA Socioeconomic Data and Applications Center (SEDAC).
Map: Max Roser (2018) - "The map we need if we want to think about how global living conditions are changing". Published online at OurWorldInData.org. Retrieved from: 'https://ourworldindata.org/world-population-cartogram' [Online Resource]'

“Pixelated” Canada

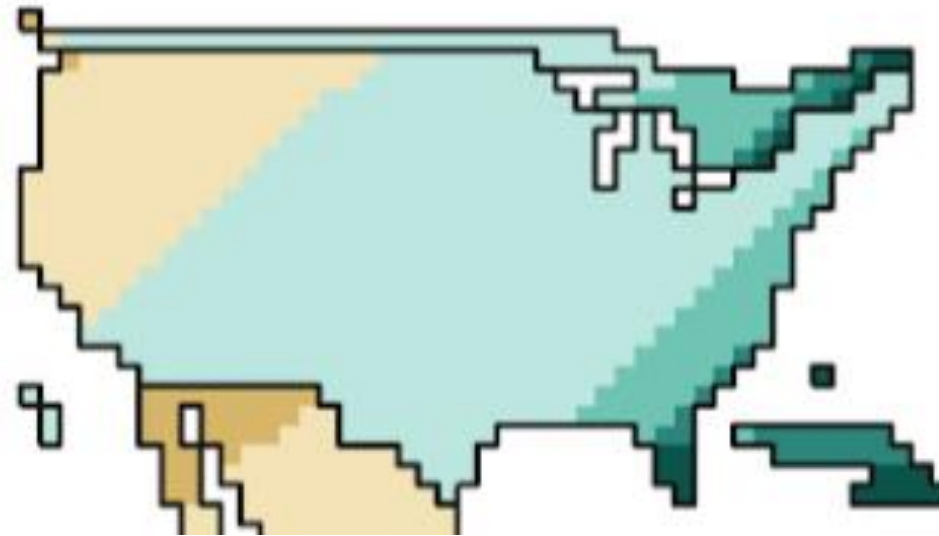


Bad idioms

- Countries were drastically resized (to the point that they became unrecognizable)
- Multiple colours were used to represent each country
- No explanation on why the countries were “pixelated” (In reality, one “pixel” = 500,00 people)
- No correlation between the visualization and the actual air pollution situation



“Pixelated” USA

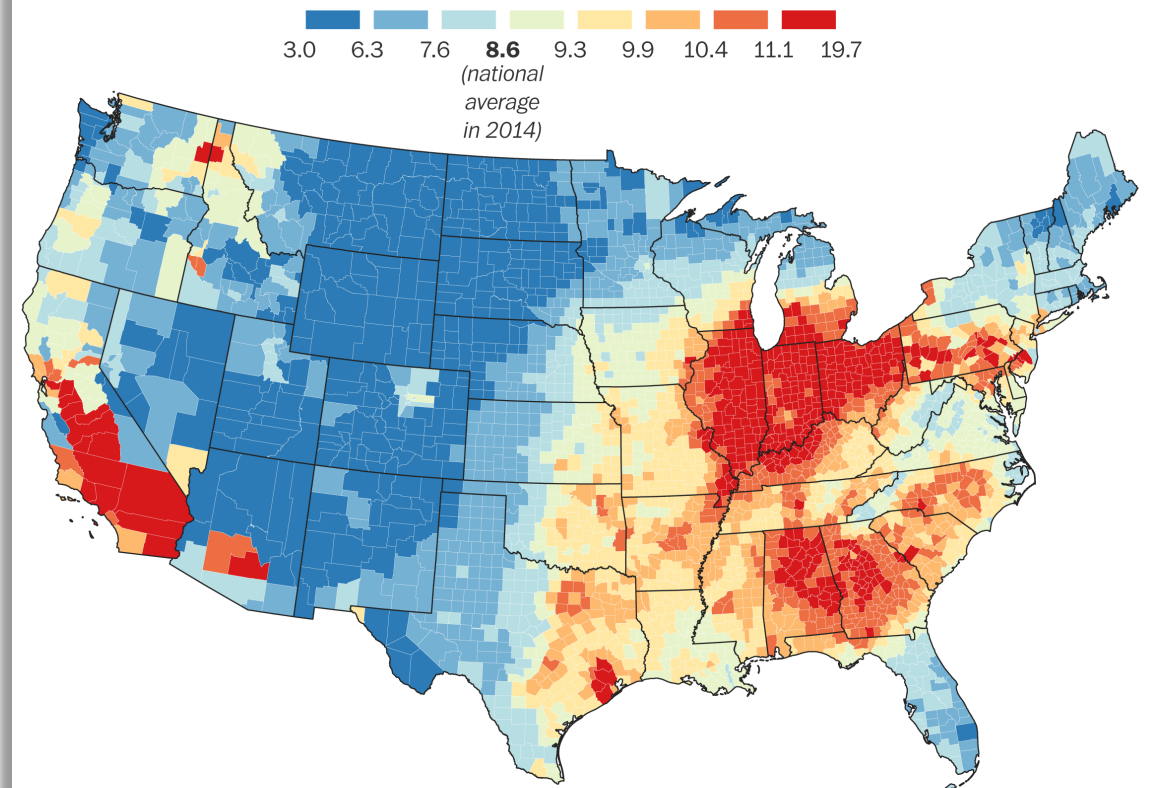


Difference between the “Pixelated” USA and the actual air pollution situation in the USA

Actual air pollution in USA (2014)

The map of American air pollution

Daily average small particulate matter (PM2.5) concentration in 2014

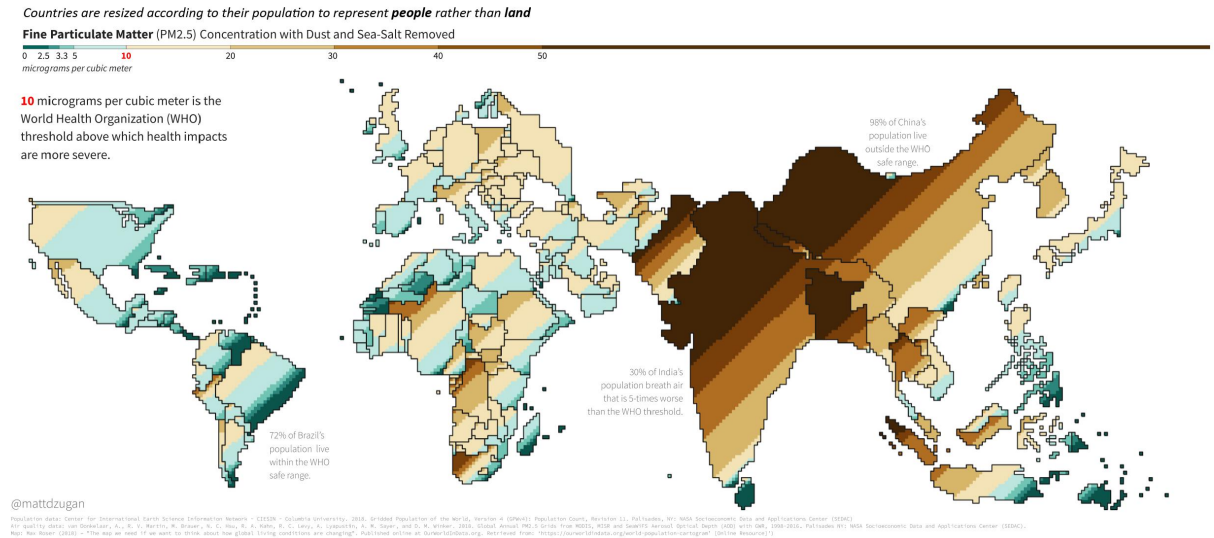


Source: Robert Wood Johnson Foundation County Health Rankings

THE WASHINGTON POST

Design Violations

- Law of Prägnanz (Simplicity Law)
- Jakob's Law
- Krug's 1st Law of Usability



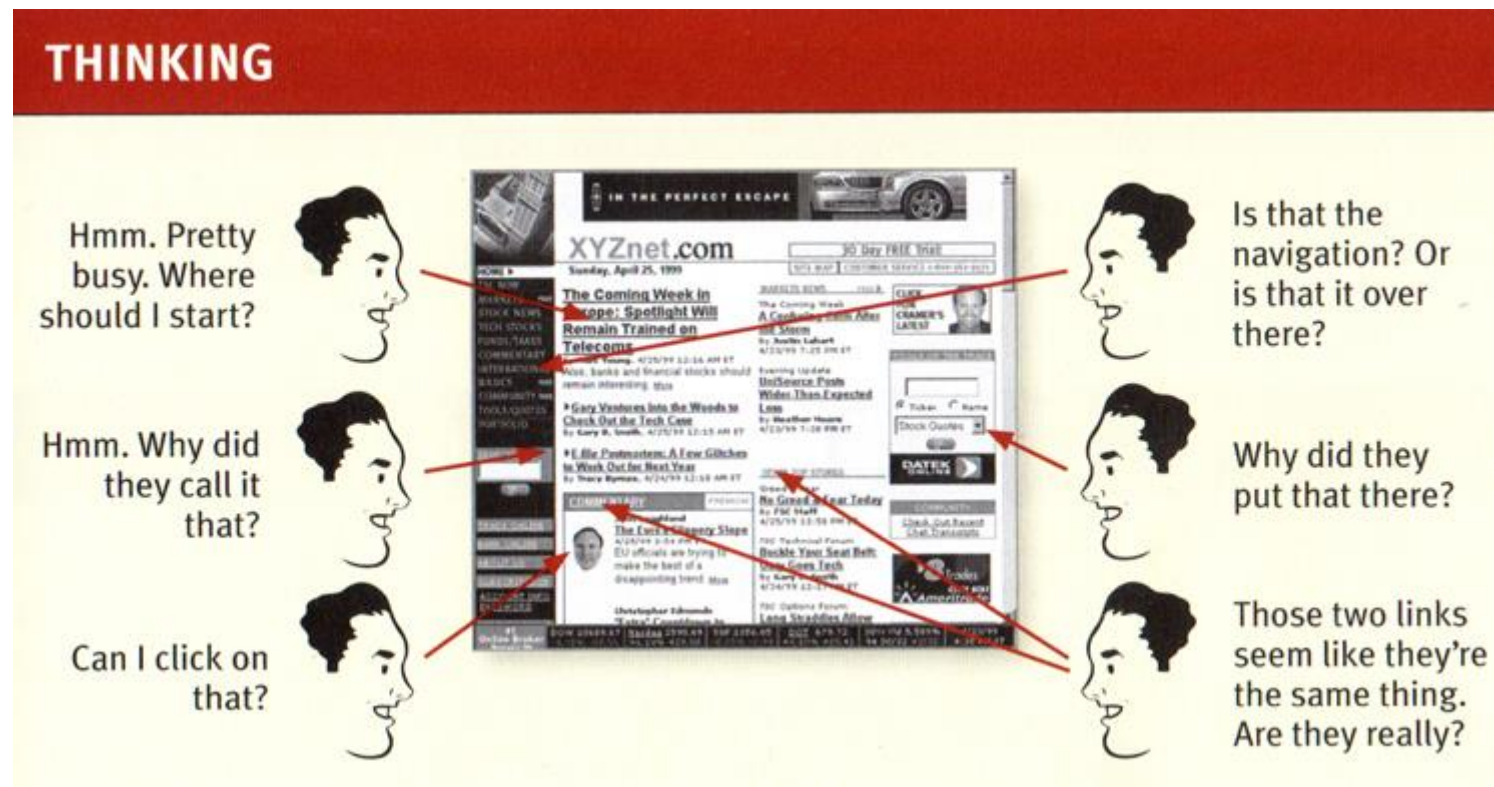
Krug's First Law of Usability – Don't make me think!

The design of a web page or anything that you design **should be self-evident and obvious**. The users should be able to “get it” instantly after looking at the screen.

More the users spend time in thinking about what all components/elements are about, the **more hurdles we introduce** in their process of exploring (or experiencing) the product and costs users their precious time.

- @aniket.ambekar, Medium.com

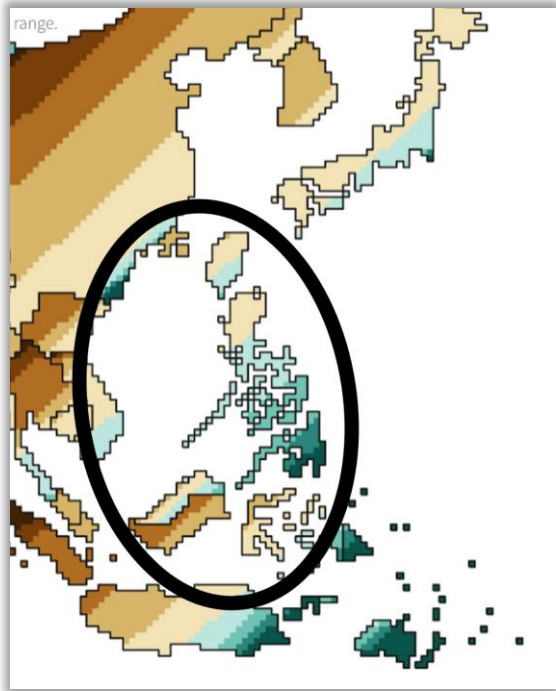
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Extracted from: Don't Make Me Think: Revisited by Steve Krug

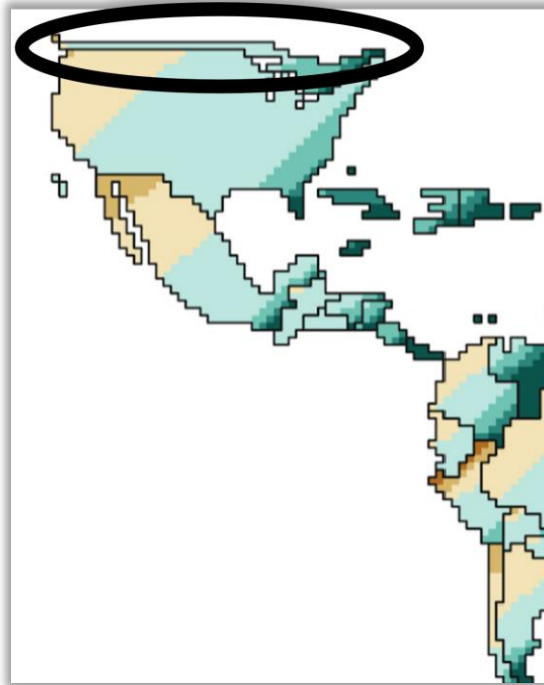
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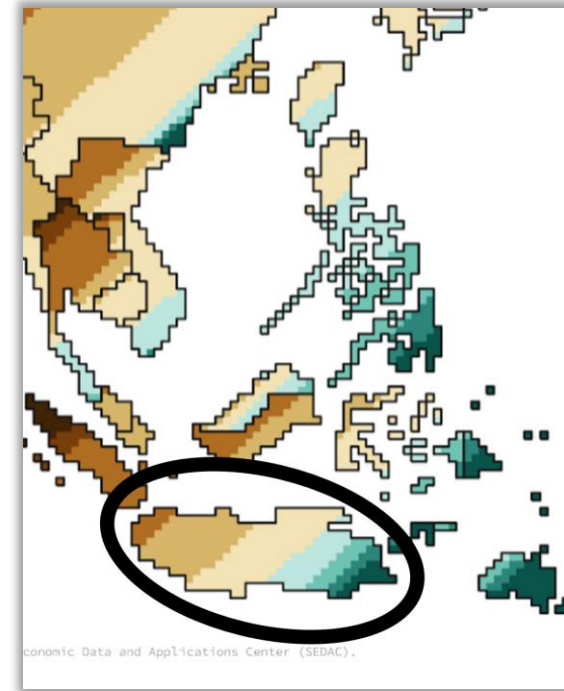
Law of Prägnanz

Different shapes and sizes were utilised to fit the countries on the density map



Jakob's Law

Many countries were shrunk/enlarged and re-positioned to fit the diagram



Krug's 1st Law of Usability

Different colours across the scale are used. What do the colours mean?

Proposed Revised Graph

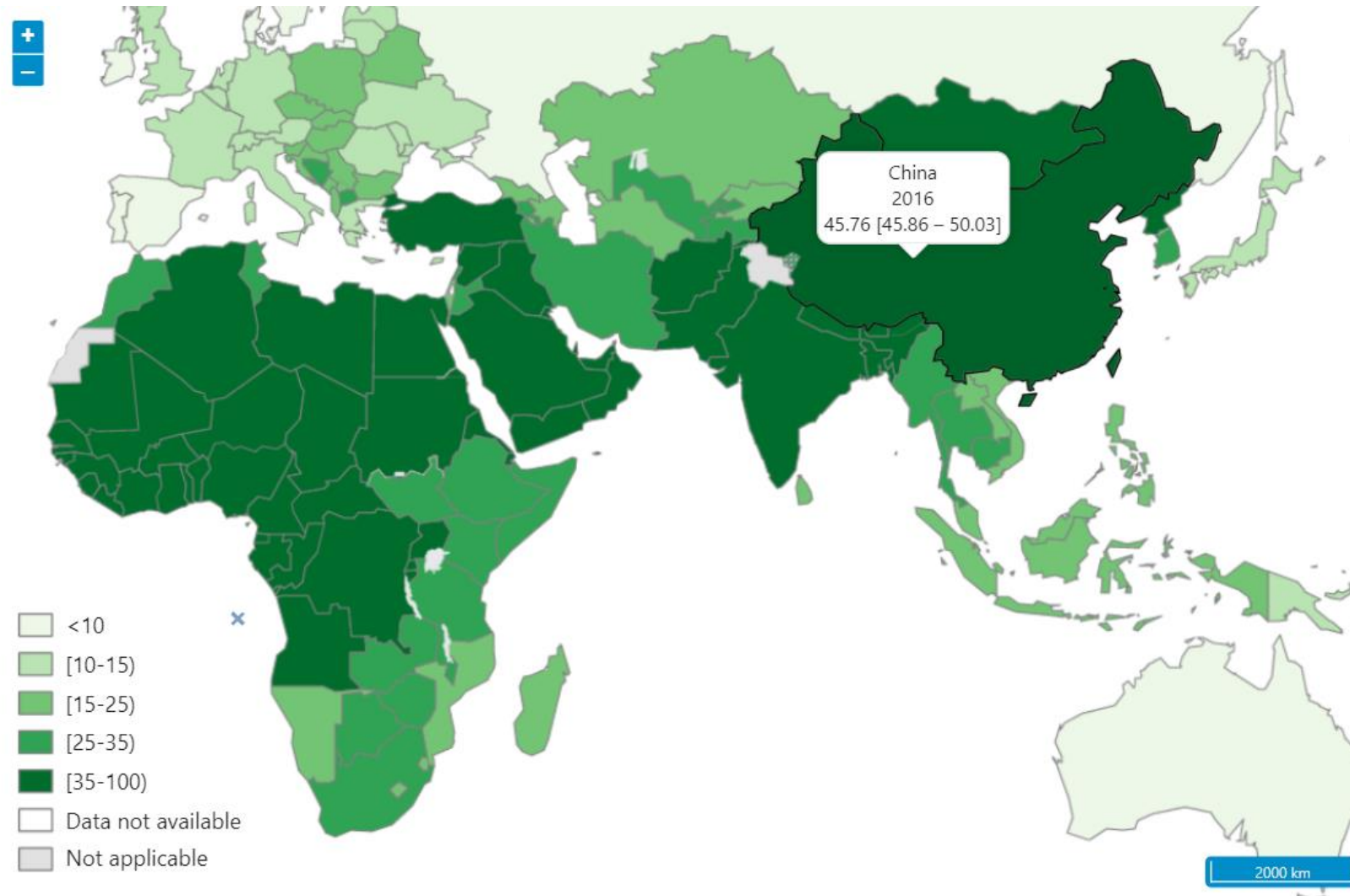


Image from [https://www.who.int/data/gho/data/indicators/indicator-details/GHO/concentrations-of-fine-particulate-matter-\(pm2-5\)](https://www.who.int/data/gho/data/indicators/indicator-details/GHO/concentrations-of-fine-particulate-matter-(pm2-5))

Thank you!