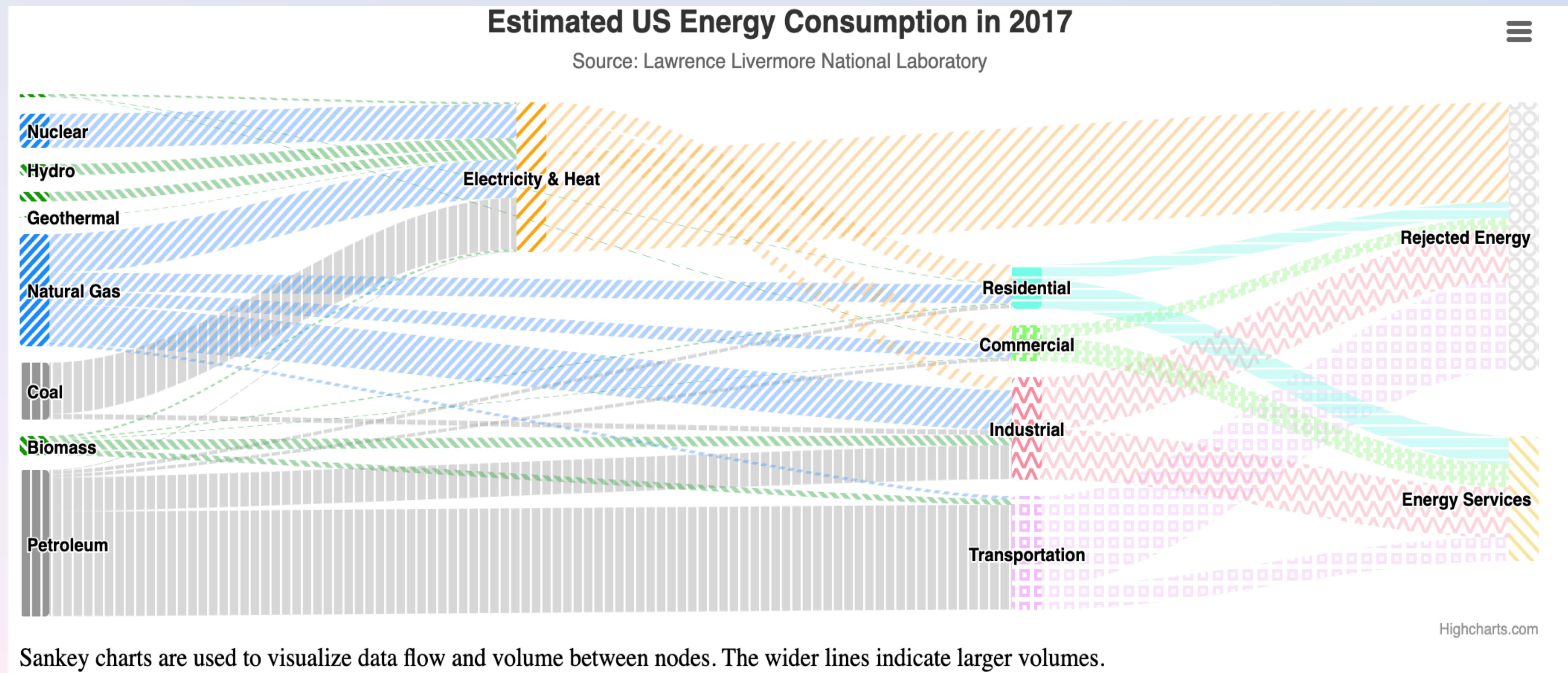
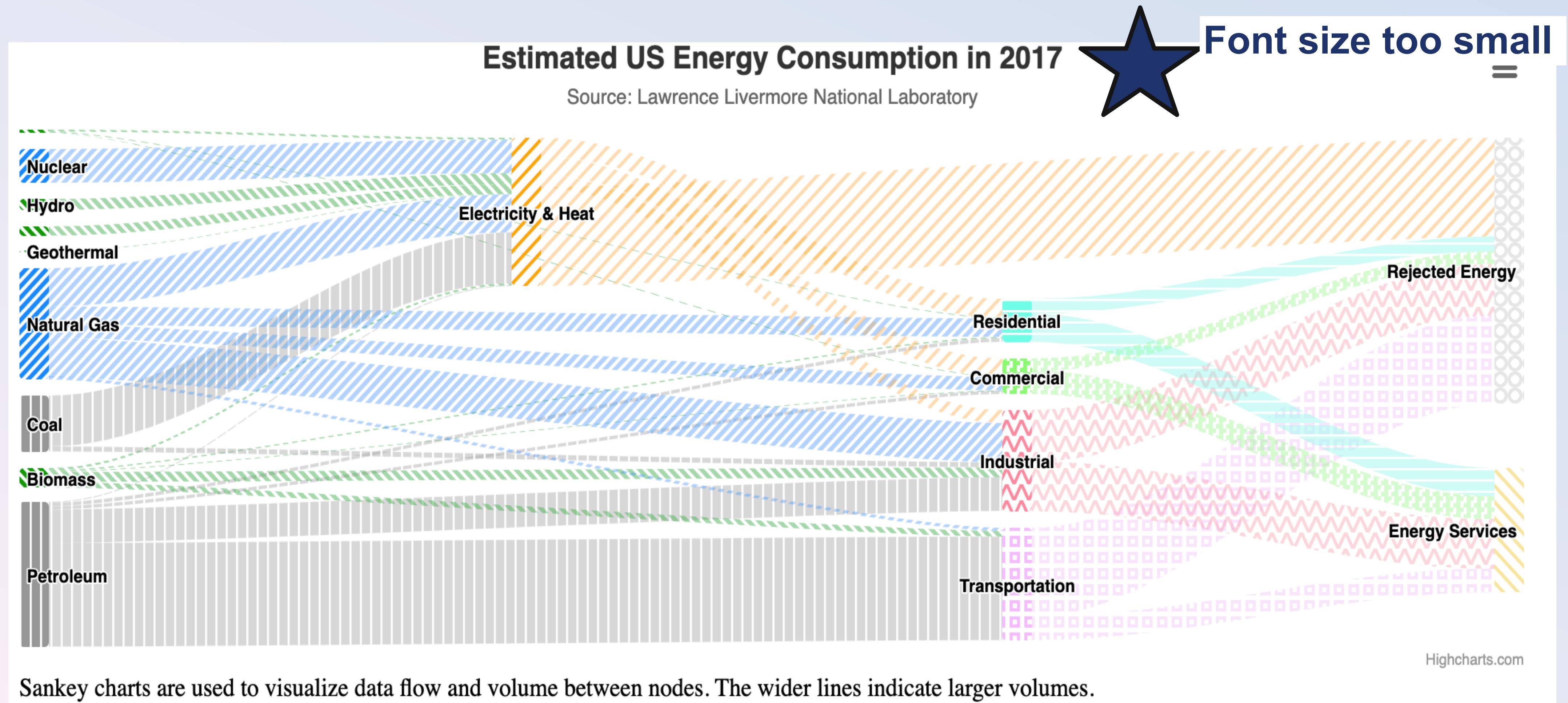


Chapter 3, Episode 4: Flexible barriers

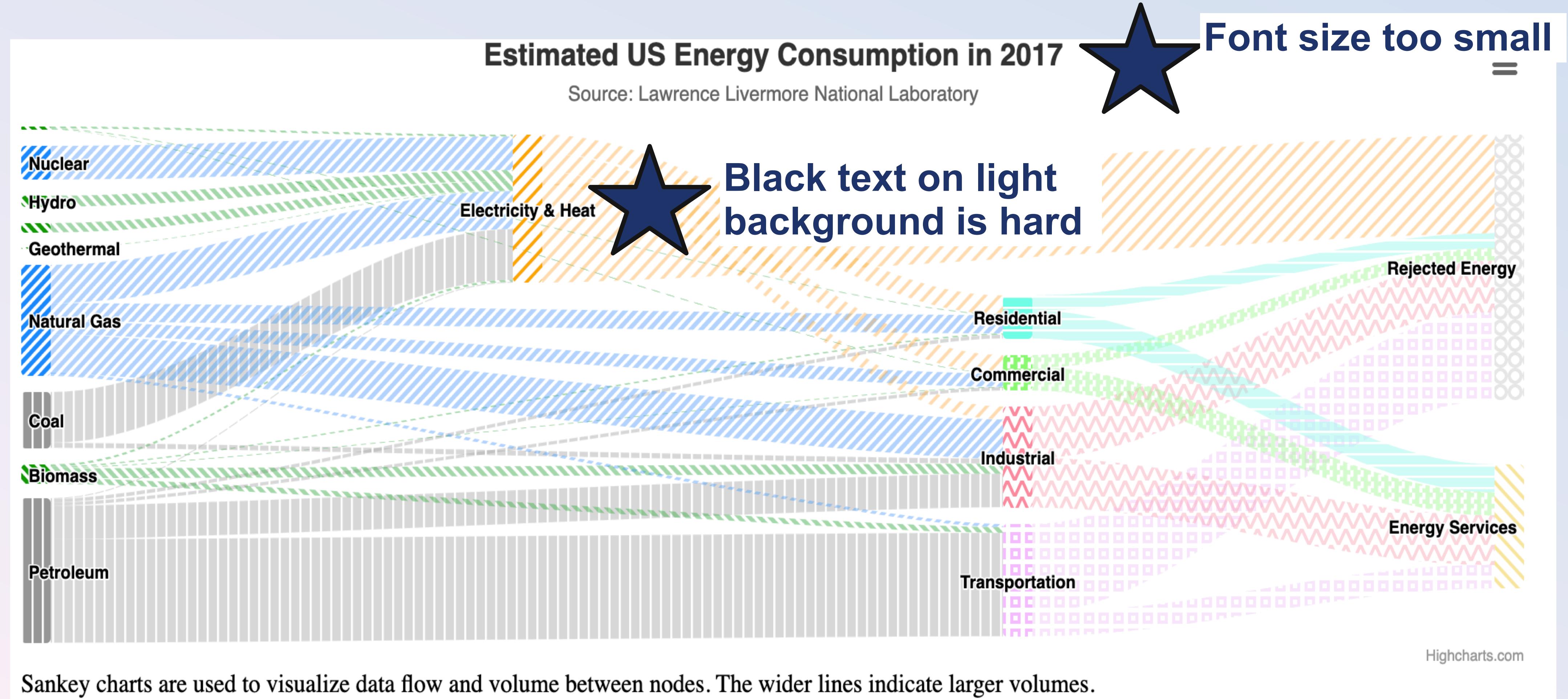
What about this visualization might be a barrier?



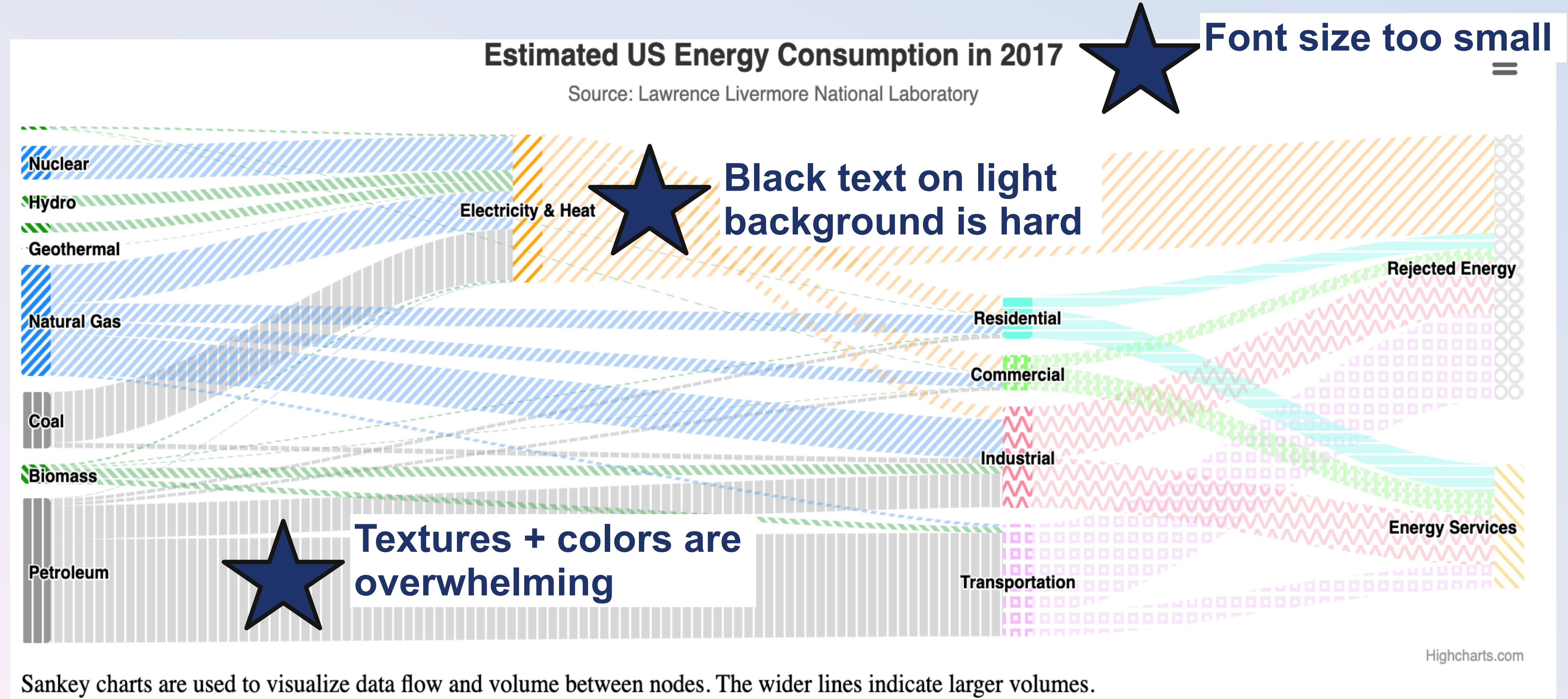
What about this visualization might be a barrier?



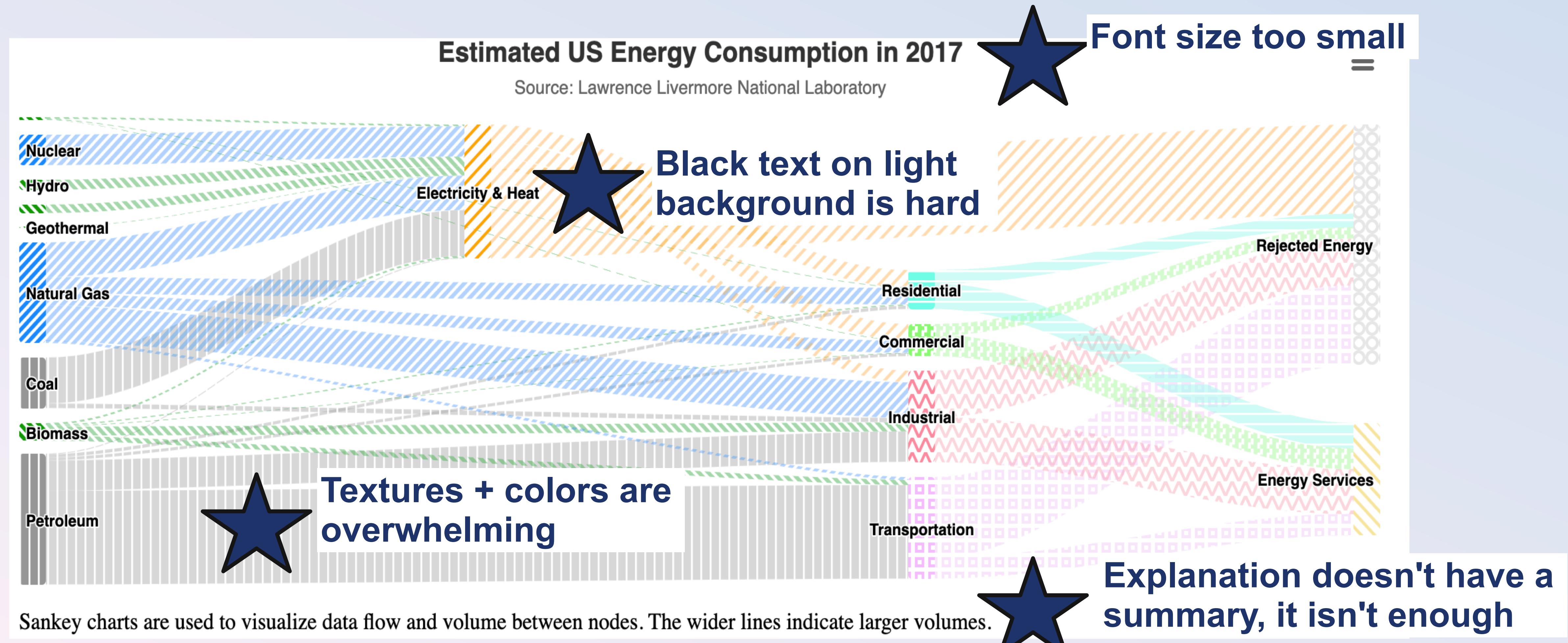
What about this visualization might be a barrier?



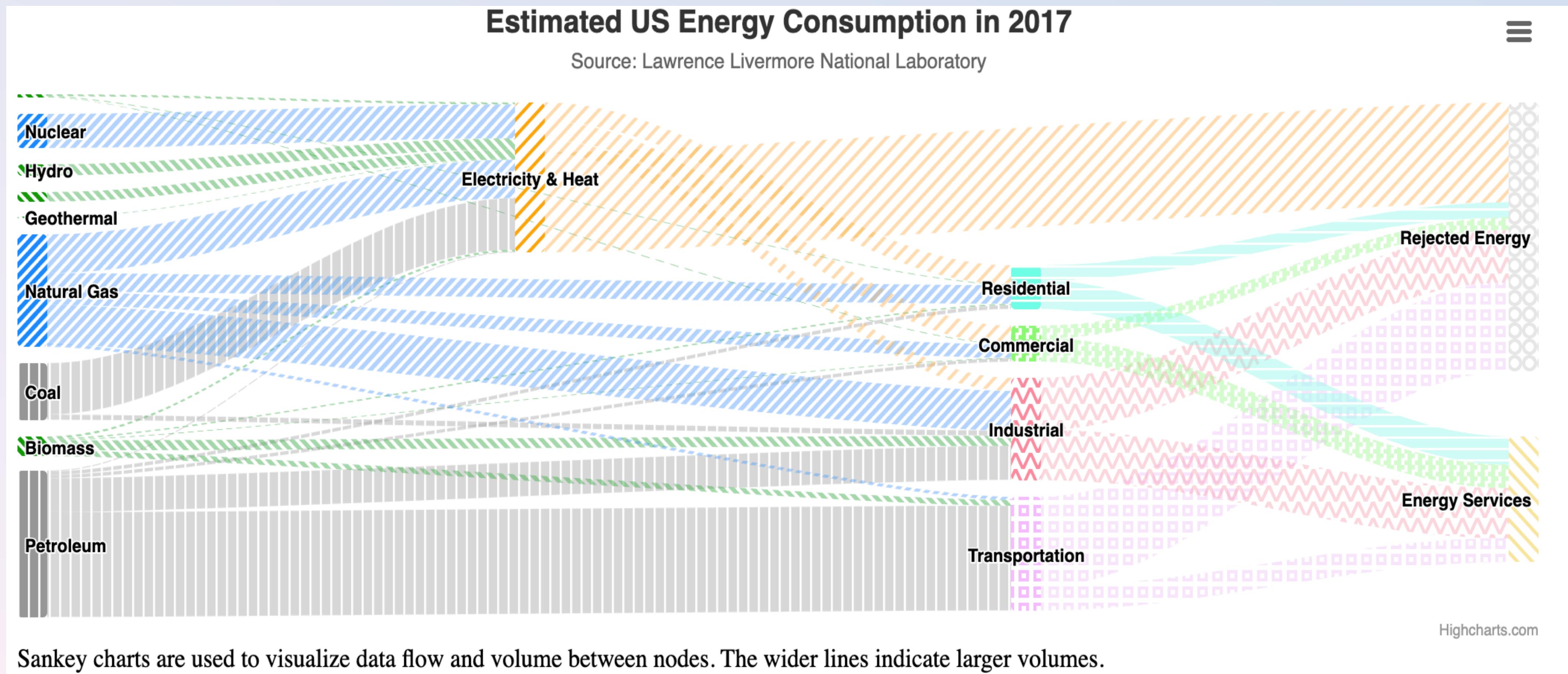
What about this visualization might be a barrier?



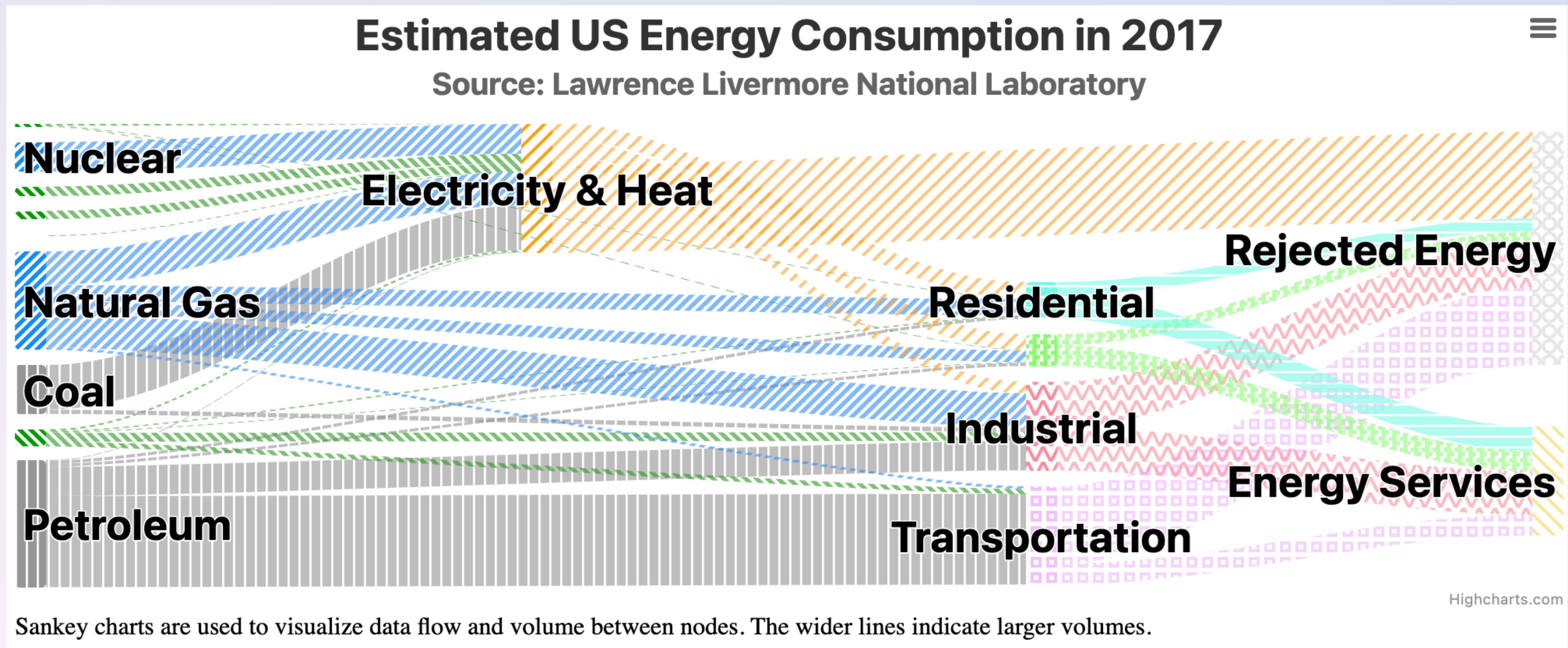
What about this visualization might be a barrier?



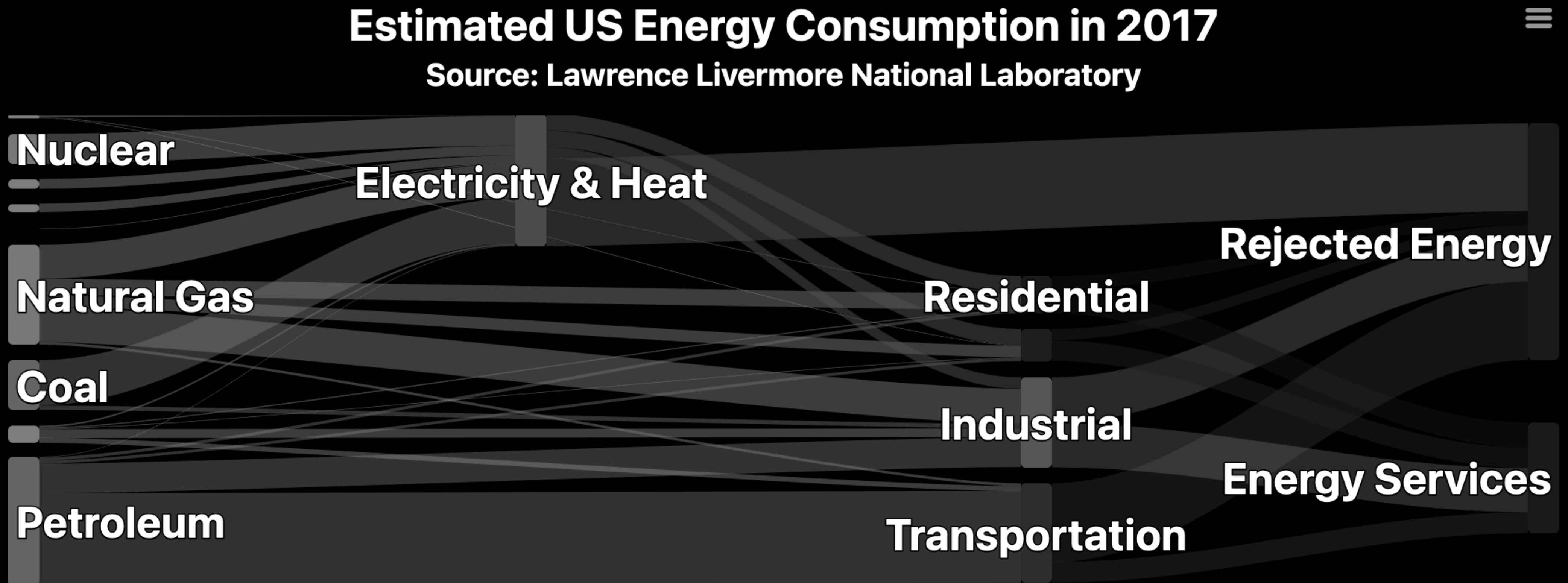
Can we fix this?



Maybe we can bump up the text size

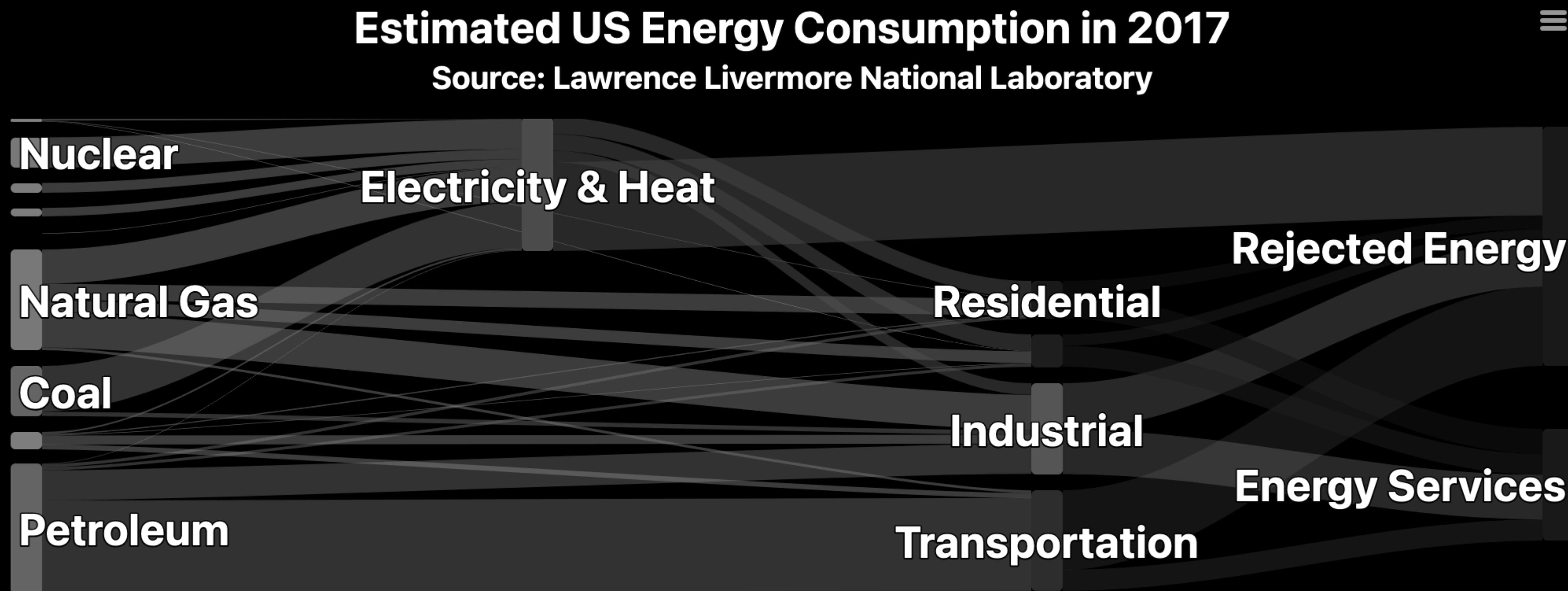


We can reduce visual complexity too



Sankey charts are used to visualize data flow and volume between nodes. The wider lines indicate larger volumes.

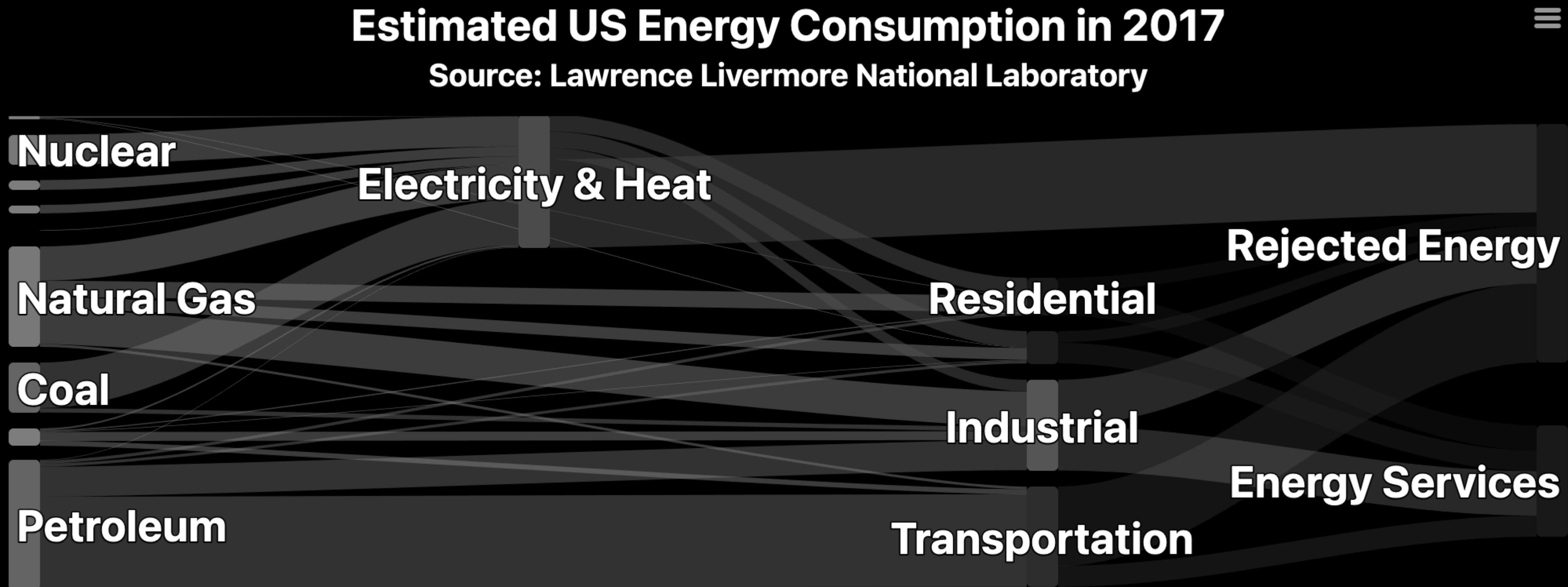
We can add a more descriptive explanation



Sankey charts are used to visualize data flow and volume between nodes. Visually wider lines indicate larger volumes. This chart is showing energy consumption and types. Interacting with this chart by selecting a node or flow (such as with a click) will update the stacked bar chart below.

Highcharts.com

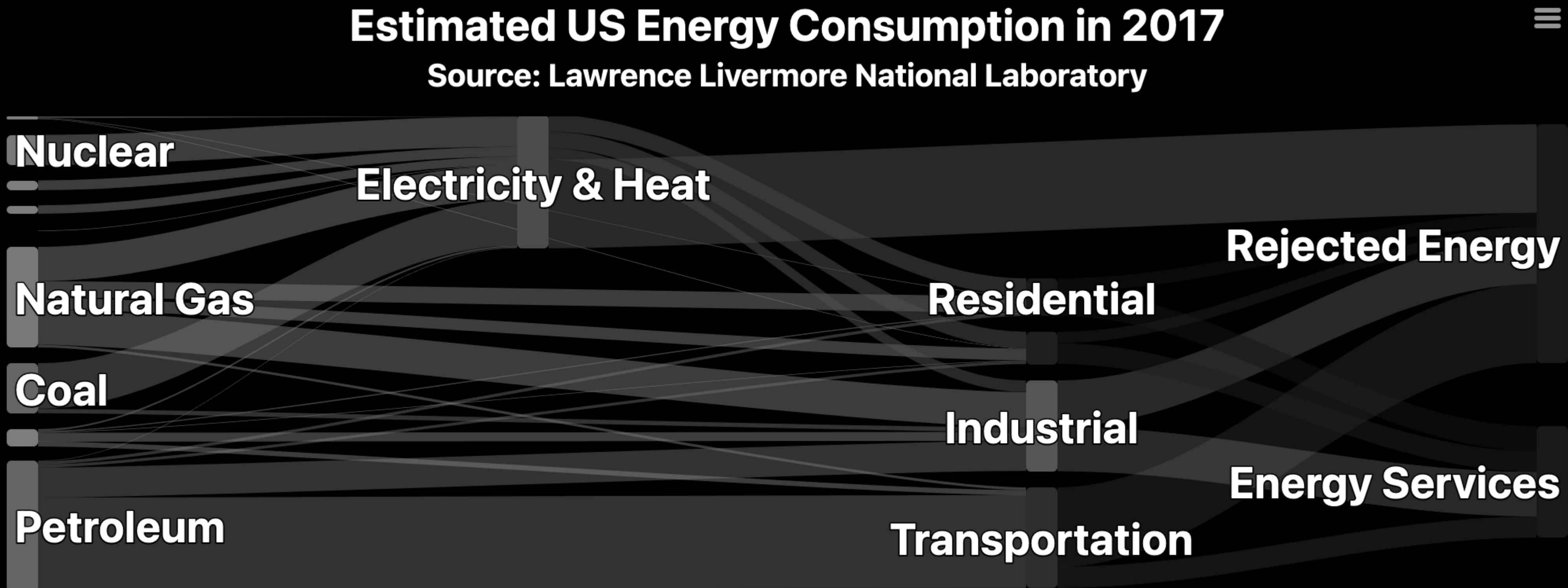
Is this the *perfect*, most accessible design?



Highcharts.com

Sankey charts are used to visualize data flow and volume between nodes. Visually wider lines indicate larger volumes. This chart is showing energy consumption and types. Interacting with this chart by selecting a node or flow (such as with a click) will update the stacked bar chart below.

Bad news...



Sankey charts are used to visualize data flow and volume between nodes. Visually wider lines indicate larger volumes. This chart is showing energy consumption and types. Interacting with this chart by selecting a node or flow (such as with a click) will update the stacked bar chart below.

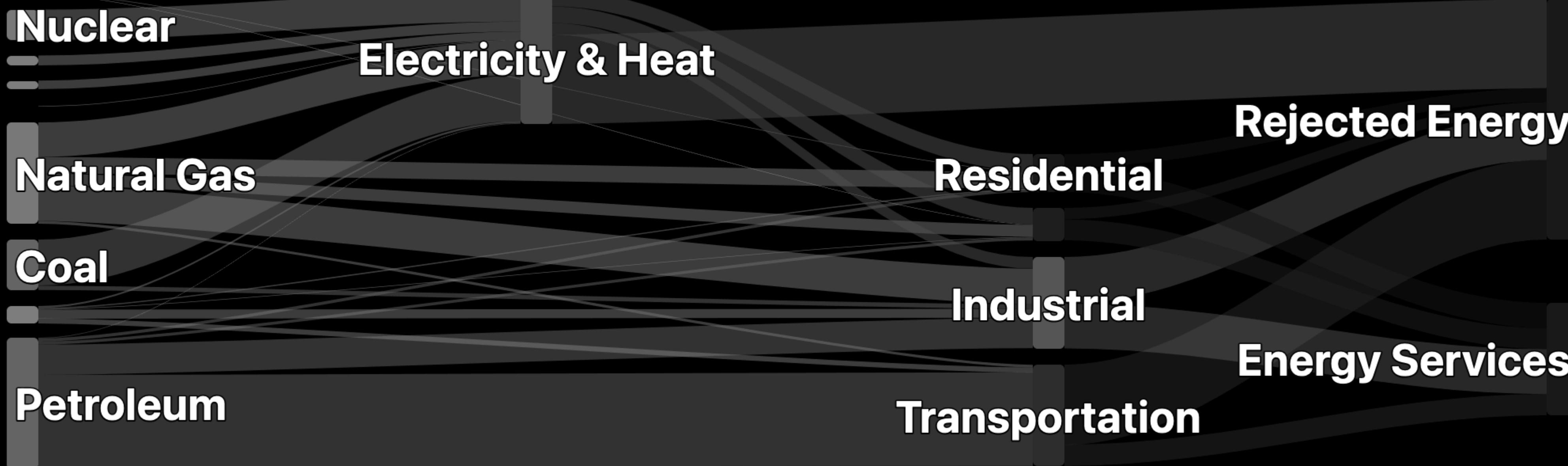
Bad news...



This design has
accessibility issues too

Estimated US Energy Consumption in 2017

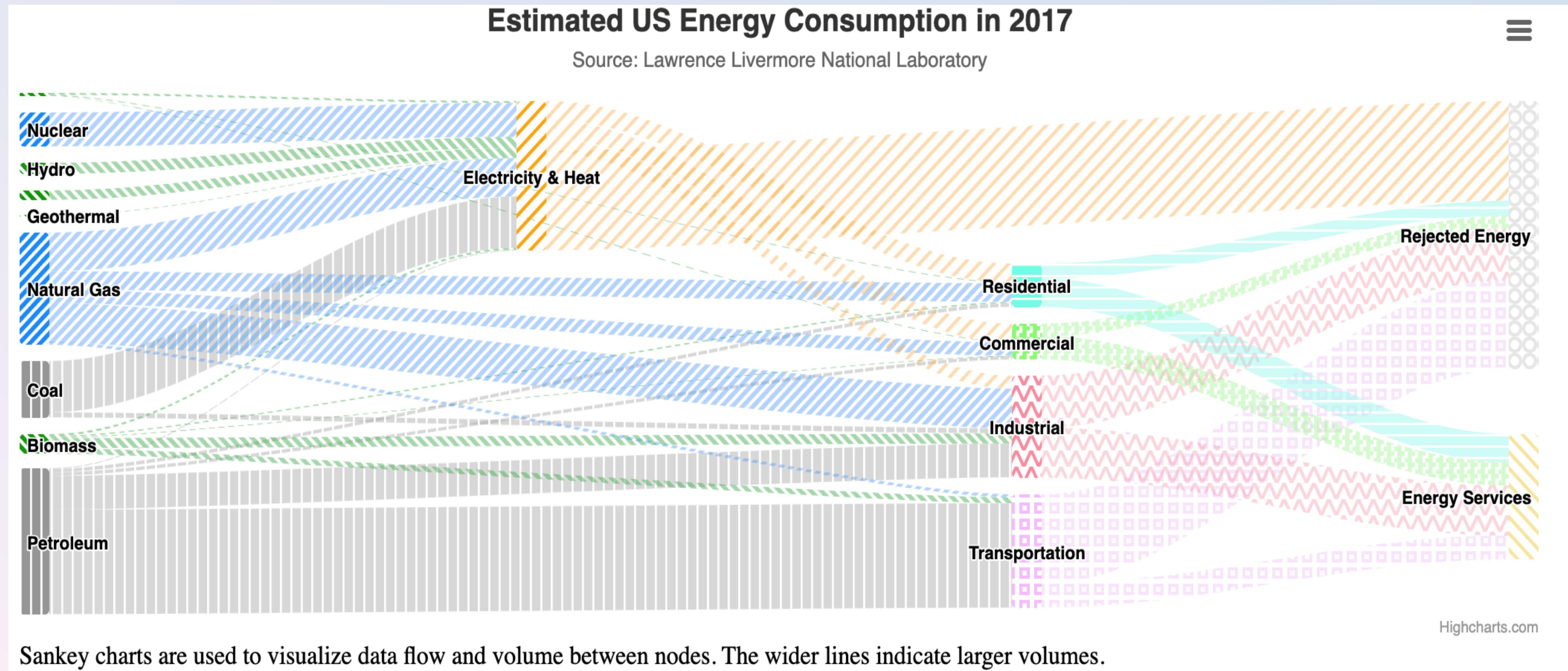
Source: Lawrence Livermore National Laboratory



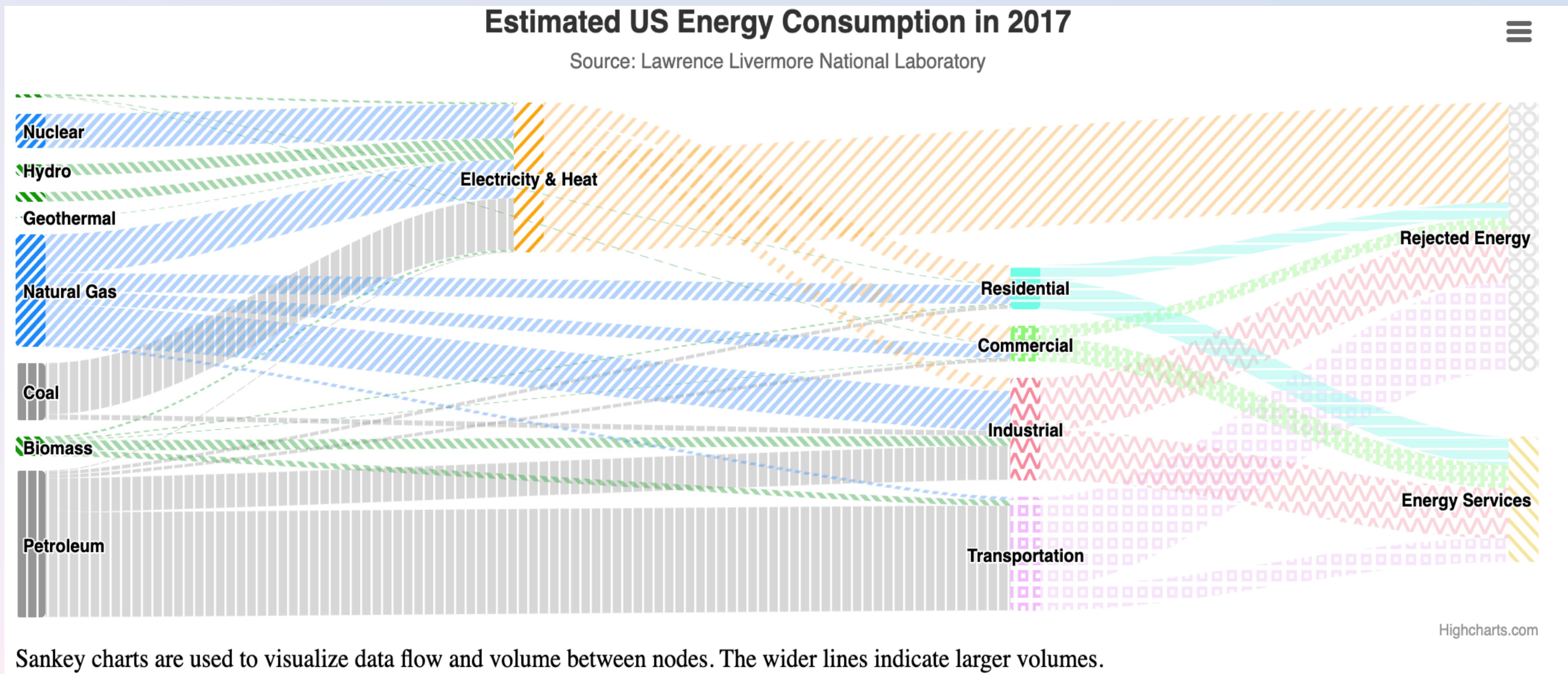
Highcharts.com

Sankey charts are used to visualize data flow and volume between nodes. Visually wider lines indicate larger volumes. This chart is showing energy consumption and types. Interacting with this chart by selecting a node or flow (such as with a click) will update the stacked bar chart below.

There is no such thing as a single, perfect visualization



One design cannot fit all



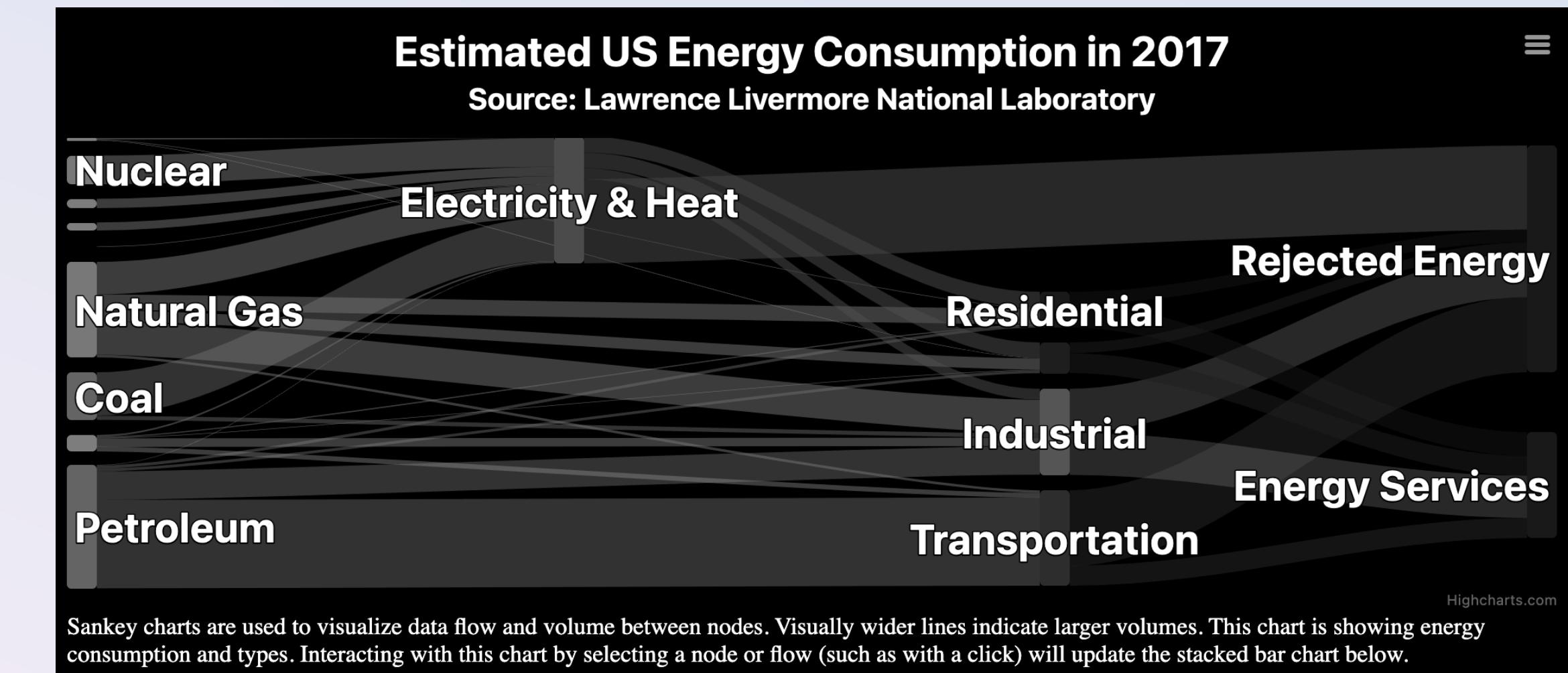
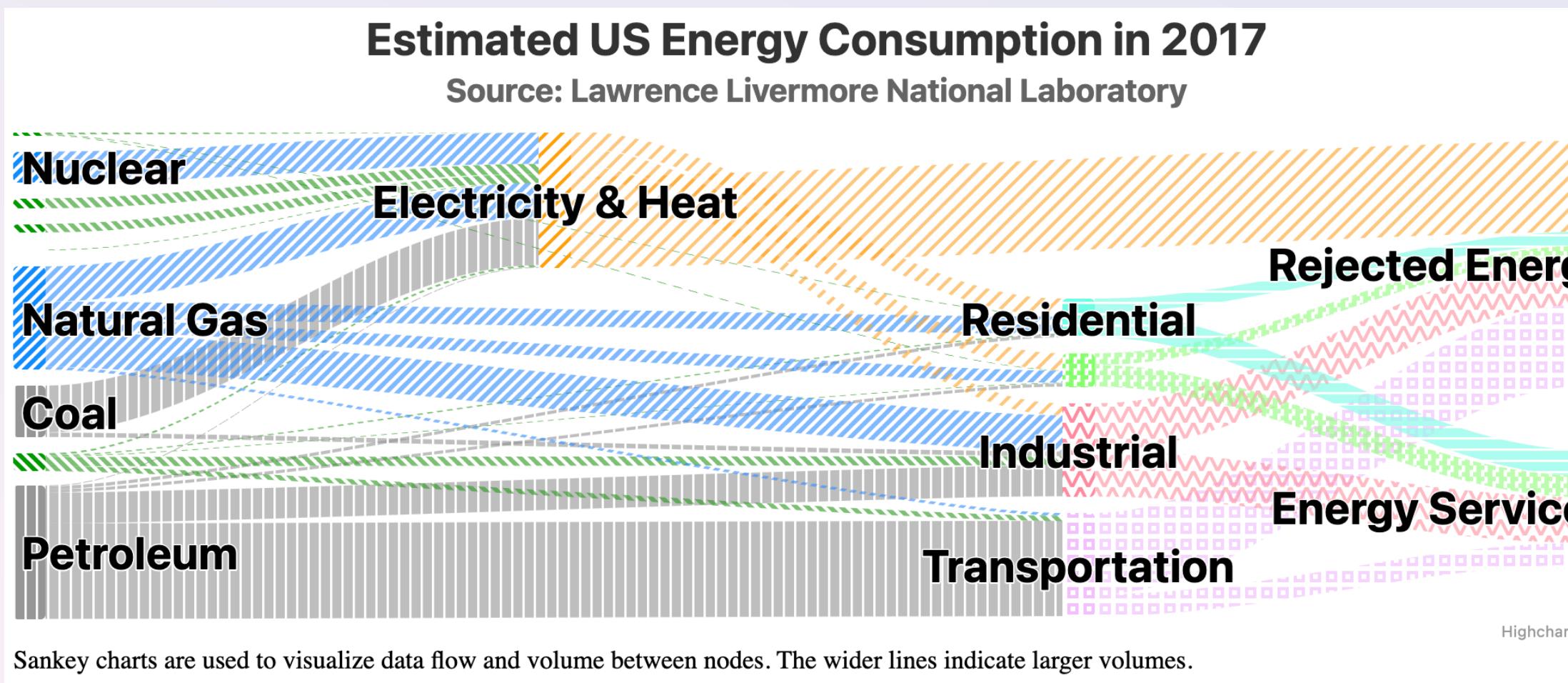
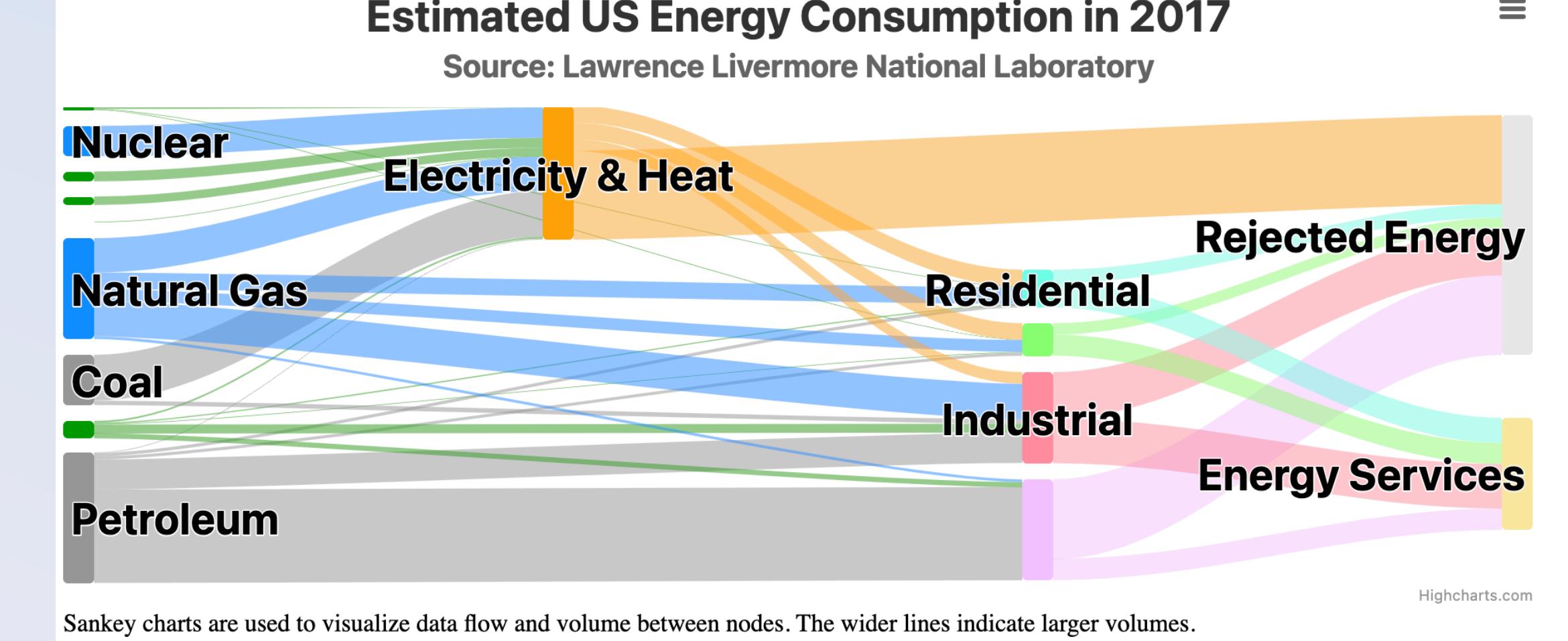
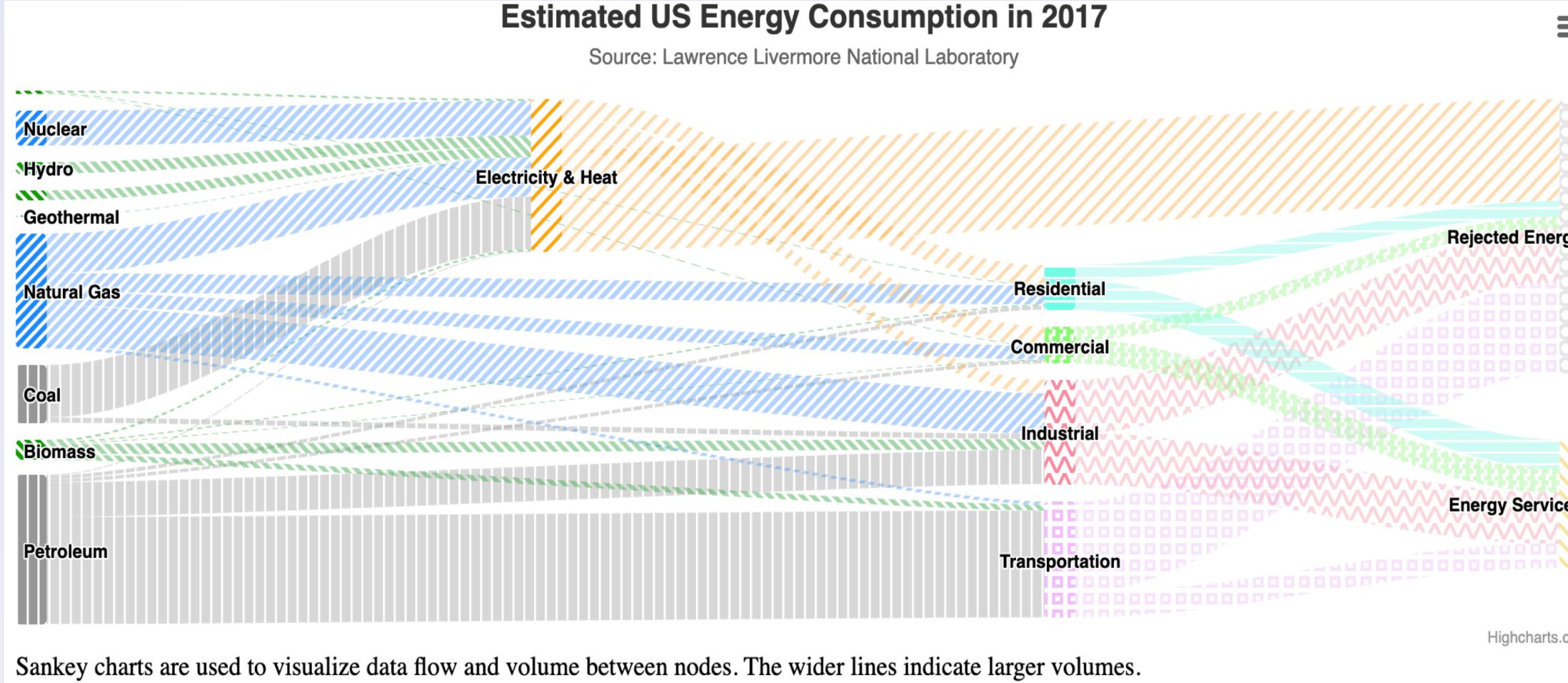
Why should our chart designs be one-size-fits-all?



Flexible

Does the user have ways to change or adjust presentational and operational aspects of this design, according to their needs and preferences?

Good design enables personalization



[Interactive demo link](#)

We have been enabling personalization for years

Video games



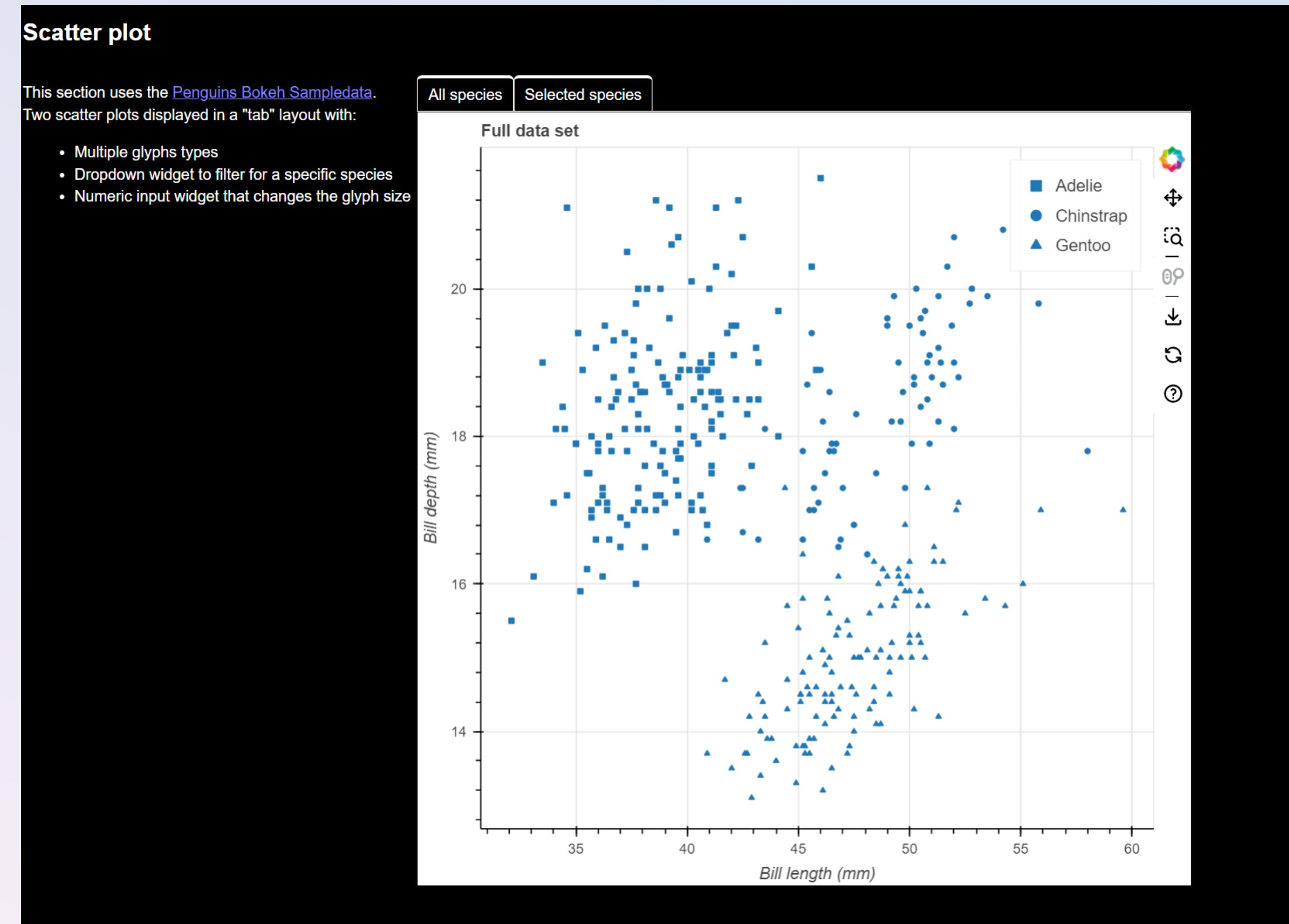
The Last of Us 2 has more than 60 settings

Devices and operating systems



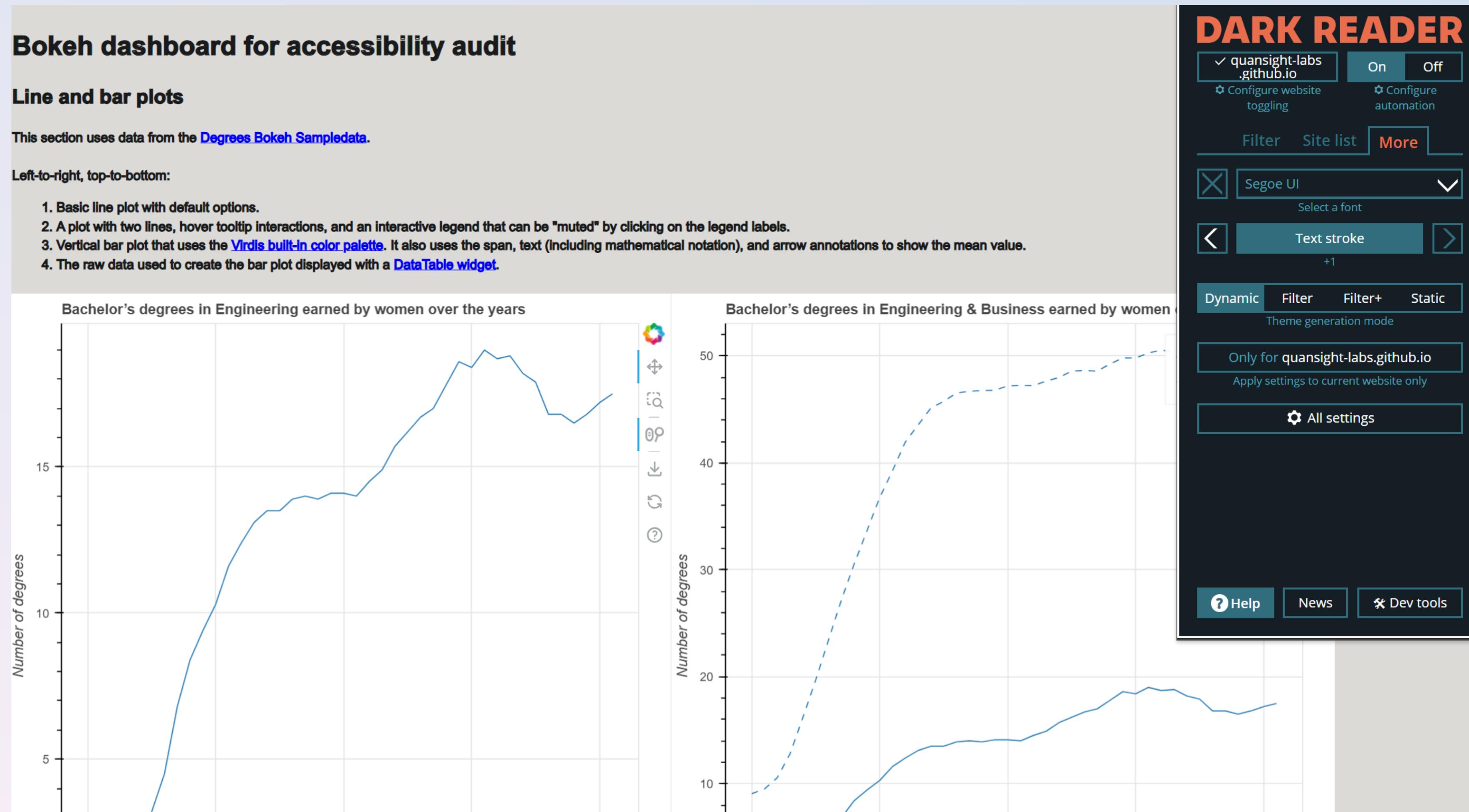
"Make it yours" is the motto for Apple's accessibility personalization

Try changing contrast



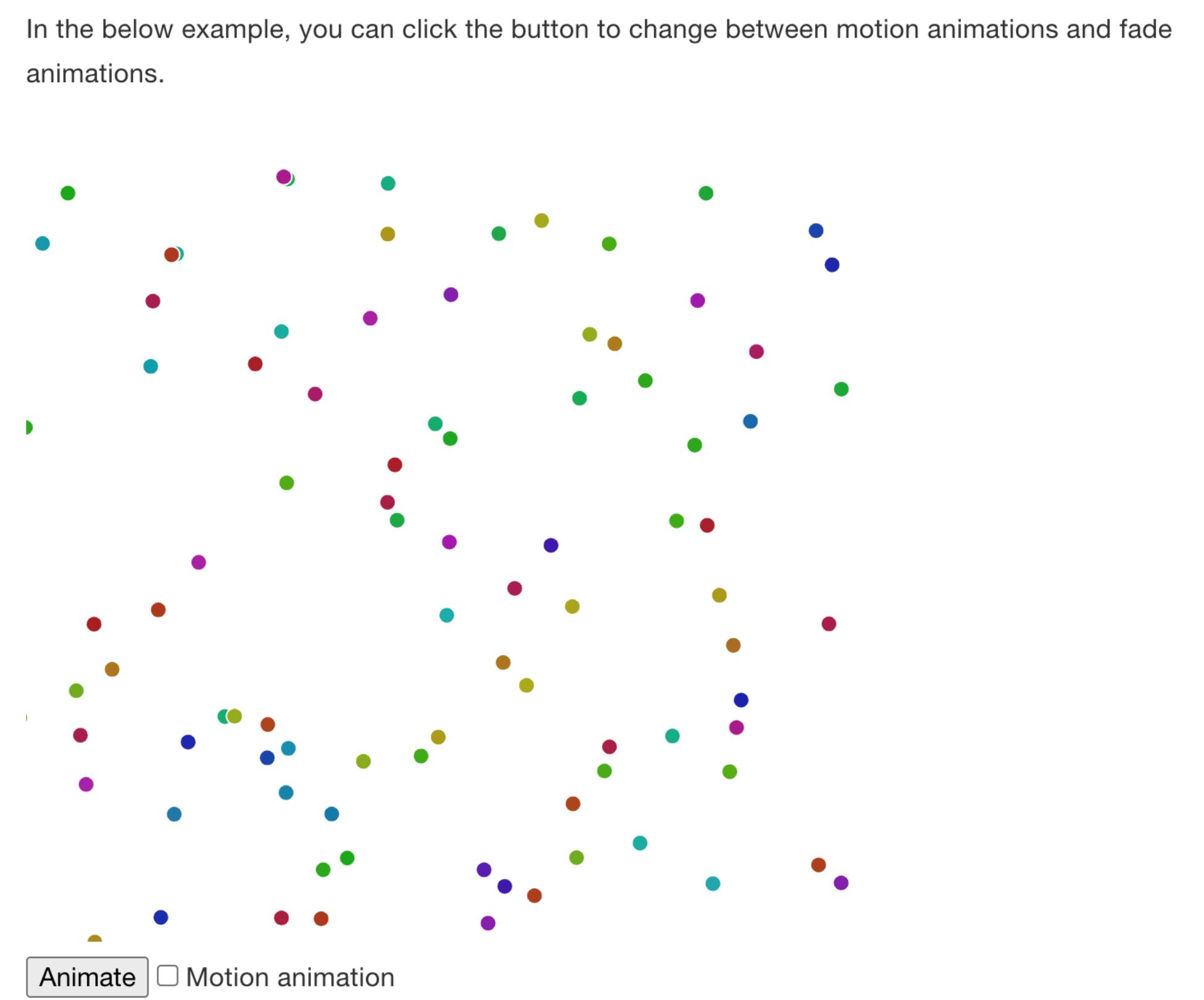
Source: [Our audit of Bokeh's ecosystem](#)

Try changing font styling



Source: [Our audit of Bokeh's ecosystem](#)

Try reducing motion



Source: [Counterpoint, by Sivaraman et al](#)

And consider enabling more personalization too!

Preferences

This menu provides a way to customize charts and graphs. The menu is organized into categories, and adjusting the settings at the category level will adjust all of the settings within that category. Some settings within categories also have sub-settings which will also inherit higher level settings that they belong to. If wording for a category's setting is hard to understand, try changing that setting and then navigating into the menu to see which children settings it affected.

Hide unavailable options

Comprehension

default moderate robust

default moderate robust

[► Show more comprehension options...](#)

Text visuals

default minimalist moderate maximalist

default minimalist moderate maximalist

[▼ Show more text visuals options...](#)

Font Size

default small medium large

default small medium large

[► Show more font size options...](#)

Font Weight

default 100 400 700

default 100 400 700

[► Show more font weight options...](#)

Color and contrast

default minimalist maximalist

default minimalist maximalist

[▼ Show more color and contrast options...](#)

Estimated US Energy Consumption in 2017

Source: Lawrence Livermore National Laboratory

Highcharts.com

Nuclear

Natural Gas

Coal

Petroleum

Electricity & Heat

Rejected Energy

Residential

Industrial

Energy Services

Transportation

Energy Sources

Highcharts.com

Source	Total Quads
Geothermal	0.0
Solar	0.77
Wind	0.5
Hydro	2.76
Biomass	0.5
Nuclear	8.42
Coal	13.96
Natural Gas	28.0
Petroleum	36.2

Monthly Energy Consumption

Highcharts.com

Month	Solar	Nuclear	Hydro	Wind	Geothermal	Natural Gas	Coal	Petroleum
Jan	0.5	3.5	0.5	0.5	0.5	0.5	0.5	0.5
Mar	1.0	3.5	0.5	0.5	0.5	0.5	0.5	0.5
May	0.5	2.0	0.5	0.5	0.5	0.5	0.5	0.5
Jul	0.5	1.5	0.5	0.5	0.5	0.5	0.5	0.5
Sep	0.5	2.0	0.5	0.5	0.5	0.5	0.5	0.5
Nov	0.5	3.5	0.5	0.5	0.5	0.5	0.5	0.5

[Play chart sonification](#)

Chart showing stacked columns for comparing quantities. Stacked charts are often used to visualize data that accumulates to a sum.

Line chart for comparing change in data across categories. Line charts are often used to visualize change in data over time, showing important trends. Sonification will play all values selected in legend.

Flexible Evaluation Toolkit:

- 1. Does your visualization import existing personalization?**
 1. Test system contrast (light and dark, see: our [Bokeh Audit](#))
 2. Test font color/size/stroke/spacing (see: our [Bokeh Audit](#))
 3. Test for motion reduction (see: [Counterpoint](#))
- 2. Is your flexibility also assistive?** Is personalization easy to find, convenient to use, and persistent?