

Renewable Energy for Ohio's Future?

Will renewable energy be the power source to keep Ohio ticking?

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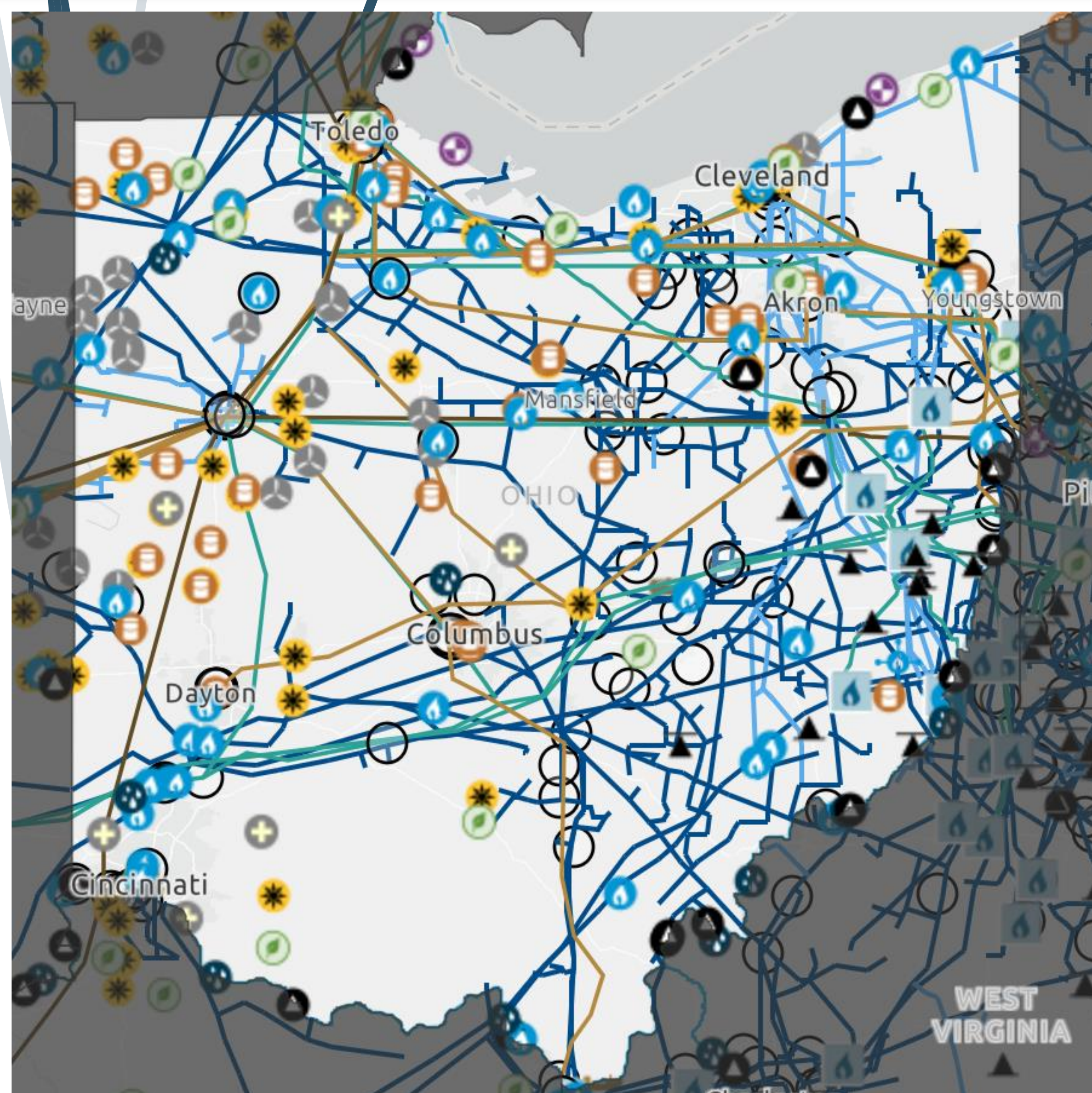


Abstract

In recent decades, talks about the need to shift to renewable energy has become more widespread. People are told that green energy can help reduce carbon emission and is more sustainable compared to traditional energy sources. Yet for Ohio in 2022, renewables supplied about 4% of the total in-state electricity generation. Our purpose with this research was to see if renewable energy sources are worth investing into. Through several categories for comparison between renewable and non-renewable by researching online, we decided whether renewable is worth the trouble for Ohio to invest in to reduce the state's electricity imports.

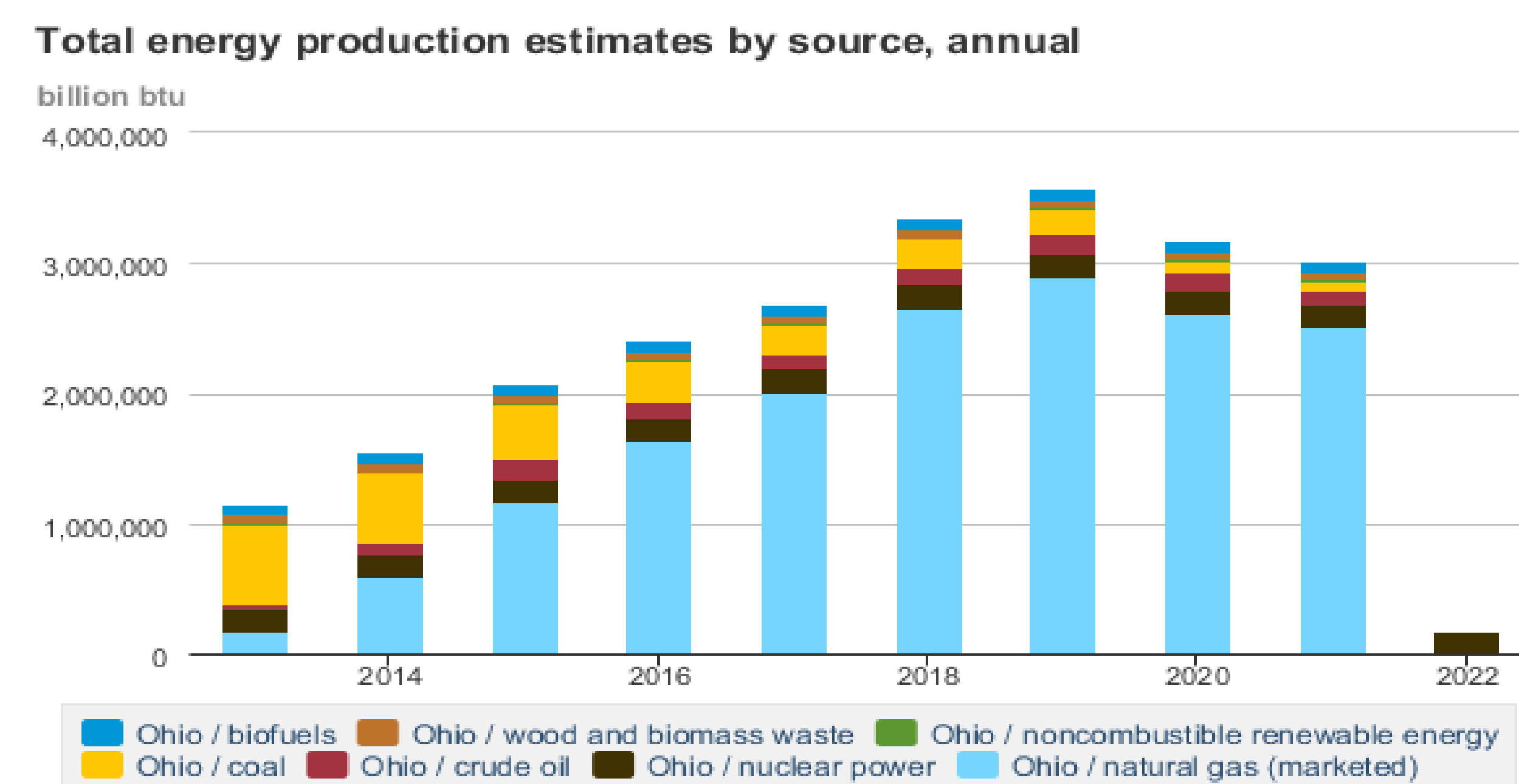
Method

We found previous research online on the topic of renewable and non-renewable energy sources, their costs, power outputs, efficiency, environmental impact, and accessibility.



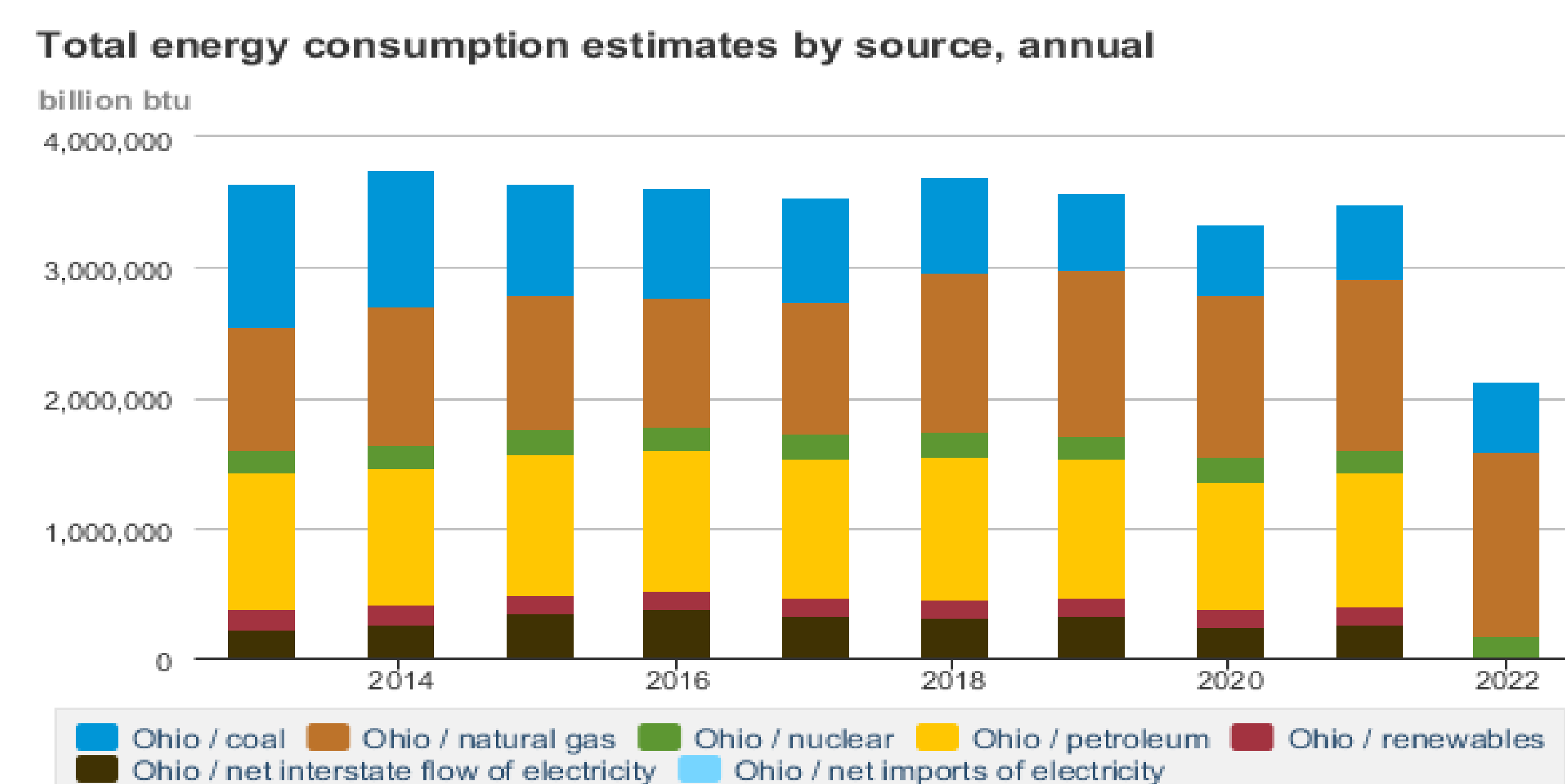
(Fig 1) Labeled map depicting icons representing all of Ohio's energy sources and their approximate location of use, map from Energy Information Administration.

Data



eia State Energy Data System (SEDS)

(Fig 2) Energy production between different leading energy sources in Ohio, graph from Energy Information Administration.



eia State Energy Data System (SEDS)

(Fig 3) Energy consumption across different leading energy sources in Ohio, graph from Energy Information Administration.

Environmental Characteristics- A description of the characteristics associated with each possible generation resource.	Biomass Power	Air Emissions and Solid Waste
	Coal Power	Air Emissions and Solid Waste
	Hydro Power	Wildlife Impacts
	Natural Gas Power	Air Emissions and Solid Waste
	Nuclear Power	Radioactive Waste
	Oil Power	Air Emissions and Solid Waste
	Solar Power	No Significant Impacts
	Wind Power	Wildlife Impacts

(Fig 4) Ohio environmental impact associated with different energy sources, table from Illuminating Company and Toledo Edison, *Environmental Disclosure*.

	Production	Production Cost	Environment Impacts	Economic Impacts	Efficiency/ Accessibility	Total
Wind	3	10	7	3	4	27
Solar	2	3	8	4	2	19
Nuclear	7	1	9	7	10	34
Natural Gas	8	6	5	9	9	37
Coal	6	6	5	9	9	35

Scale: 1 - Bad, 10 - good

(Fig 5) Decision Matrix comparing main energy sources and main characteristics impacting usefulness for Ohio, table from CSU Vikings Racing.

Analysis

The biggest supplier of energy in Ohio is natural gas, followed by coal and petroleum. Renewable energy sources ended up at the bottom of the list. There are a couple factors to this, the biggest being how inconsistent renewable sources of energy are output wise. Solar power is only able to output full power about three months of the year and wind being inconsistent all the time. These renewable sources of energy cannot yet compete with the consistency and efficacy of non-renewable energy sources

Conclusion

All in all, Ohio should continue investing into renewable energy to keep the sources going while focusing more on research for technological improvement. Right now, renewable sources don't have the ability to completely take over as the main supplier of electricity in Ohio. Improving the technology will get it to a point where sources of renewable energy can become a major supplier of energy in Ohio.

References

- 1) State Energy Profiles, *eia.gov*, U.S. Energy Information Administration <https://www.eia.gov/beta/states/states/oh/data/dashboard/total-energy>
- 2) Interactive GIS Data Viewer, *eia.gov*, U.S. Energy Information Administration
- 3) "Environmental Disclosure - Quarterly Comparisons" The Illuminating Company and Toledo Edison, <https://www.firstenergycorp.com/content/dam/customer/gethelp/files/brochures/environmental%20disclosures/Ohio/Ohio-env-disclosure-projection.pdf>

Acknowledgments

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