

Emissions from Fossil Fuels at the Global Scale

Jon Olson, Sabrina Ewald, Steve Bryant and Hilary Olson, The University of Texas at Austin

<u>Standards:</u>	<u>ESS TEKS</u>	<u>Enviro. Sys. TEKS</u>	<u>AP Environmental Sci.</u>	<u>NGSS</u>
	1A-B, E-F, 1G, 2B-C, 3B-C, 4A-C, 12E-F	1A-B, D-G, 2B-C, 3B-C, 4A-C, 6C-D, 10C, 12A, C	6.2, 6.3, 6.4, 6.5, 7.4, 9.4, 9.5	HS-ETS1-1, 1-2, 1-3 HS-PS3-1 HS-ESS3-1, 3-2, 3-3, 3-4

Level: High School: 10th – 12th grades

Objectives:

This activity examines carbon dioxide emissions related to fossil fuel consumption. Students will use data from the Statistical Review of World Energy, an industry benchmark report on world energy markets published since 1952 by bp (British Petroleum). Beginning in 2023, the Energy Institute, a professional organization created to accelerate the global energy transition to net zero, took over responsibility for the annual report.

This activity requires analysis of real-world data and critical thinking related to our energy resource consumption and the efficiency of these resources related to electricity generation and CO₂ emissions. For coal, oil and natural gas, students will learn about the differences in energy content and quantity of CO₂ emitted and then evaluate which fossil fuels are the best option for the current scale of global energy demand.

This activity explores how energy consumption and CO₂ emissions differ amongst the United States, China and Norway. Comparison of these three countries uses their gross domestic product as an indicator of their economic health, reflecting different stages of industrialization and variations in quality of life. Students will complete an in-depth data analysis for each country to examine the relationship between a country's economy, energy consumption and CO₂ emissions.

Time Requirements:

45 minutes – 55 minutes

Teacher Preparation:

This activity was built in Google Sheets and when you click on the activity link below, it will make a copy of the file and add it to your Google Drive.

Provide students a copy of the document using your learning management system (LMS). If using Canvas as your LMS, the file can be added as an assignment using the Google Drive LTI extension and it will make a copy for each student assigned to your Canvas course. Students will be able to complete the document and submit directly in Canvas.

An alternative is to provide students a link to the document and have students make a copy to their own Google Drive. Students can then share their document with the teacher when submitting their work.

Notes about the file:

- There are formulas, information and data embedded in the document and those cells are locked to prevent students from accidentally deleting or altering the contents.
- The instructions indicate the cells into which students will enter data.

Activity Document:

[Emissions from Fossil Fuels at the Global Scale](#) (Google Sheet)