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STANFORD EARTH SCIENTISTS DEVELOP EMISSIONS TRACKING TOOL TO REDUCE CLIMATE CHANGE IMPACTS FROM ELECTRICITY USAGE

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If companies could see how much electricity they're consuming and what their emission level is every hour of the year, they could shift their operations to better match the carbon-intensity of the grid. Scientists at Stanford University, School of Earth, Energy and Environmental Sciences, have developed a precise way to measure power plant emissions hour-by-hour, twenty-four hours a day, which will allow companies to reduce their carbon footprint in real time. A study, co-authored by Jacques A. de Chalendar, John Taggart, and Sally M. Benson, was published December 2, in the-*Proceedings of the National Academy of Sciences*.- The study used an emissions tracking tool to estimate the emissions intensity of carbon dioxide and other air pollutants from a major electricity distributor and identified essential information that could be used to reduce electricity system emissions.

Emissions Tracking Study at Stanford University: Findings

According to Stanford University, about 30 percent of U.S. greenhouse gas emissions come from power plants that generate electricity by burning fossil fuels. Looking at hourly emissions will allow grid operators to determine the carbon intensity of various options to meet the grid's needs, including the carbon requirements of imports. For example, if there is a day, or time of day, that characteristically has high energy usage, with corresponding high carbon intensity, the grid operators can plan ahead and purchase energy from the cleanest source.-

For the study, the Stanford scientists calculated hourly consumption and emissions for all 66 authorities during 2016 using public data from the U.S.-Environmental Protection Agency-and the-Energy Information Administration. Their analysis revealed significant fluctuations depending on the time of day and the season. The study found that consumption and emissions in certain regions were greatest in the late afternoon on hot summer days and in early fall.

The Stanford scientists who published the study noted that the U.S. grid is one big, interconnected machine, where power generated in one place is often consumed elsewhere, and that there is likely to be an even more interconnected grid nationwide in the future.- There are 66 "balancing authorities" or regional control centers responsible for matching electricity supply and demand in the United States. When these centers import and export electricity to meet regional energy demands, the electricity consumption in one part of the grid can cause emissions of CO_2-and noxious air pollutants at another part of the grid where the electricity is produced, sometimes hundreds of miles away. For example, the study found that 30% of CO_2- emissions from producing California's electricity imports was released outside of California in states like Arizona.- And, 17 percent of total CO_2-emissions released in the Western states were generated to satisfy electrical consumption in a different region.

Arguably, states that consume imported electricity should take responsibility for exporting emissions. For example, California has a target of 100 percent carbon-free electric power by 2045. To get there, California needs to know where emissions for its electric power occur by continuously monitoring the grid. Also, to get there, the 66 balancing authorities will need to start thinking and communicating

across state lines, at the regional or even federal level. This new tool developed by the Stanford study provides a way, using publicly available data sets, to monitor electricity use and reduce its carbon footprint.

The California environmental lawyers and climate change lawyers at Bick Law LLP are monitoring studies like these for tools that will help clients reduce carbon footprints.

For more information, please visit the Stanford Earth Matters blog.