

# 4°C

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Heat waves, droughts, floods, hurricanes, and storm surges will occur with increased frequency and intensity. The result will be life-threatening sea-level rise, losses to global food supplies, and the extinction of some plant and animal species. These were the claims of the 2012 United Nations Framework Convention on Climate Change if global temperatures were to rise by 4°C. Climatic change due to the accumulation of greenhouse gasses (GHGs) has been discussed since 1896, but the 1997 Kyoto Protocol was the first global treaty imposing legally binding emission targets. The 2015 Paris Agreement followed and set the goal of limiting global warming to “well below” 2°C. It committed all nations to prepare, communicate, and maintain self-determined contributions to reduction of GHG emissions, but despite all efforts to date, worldwide emissions have never declined.

Attempts to address climate change at the global level have been frustrated by the social, political, and cultural differences across countries. There is no true consensus on the desired goal, and there has been widespread reluctance to adjust the traditional, profit-driven business model to one more in sync with environmental processes. The correlation matrix on the left shows the relationships between global CO<sub>2</sub> emissions and several other variables, including a variety of renewable energy production methods. The top row of the left matrix shows that none of the variables examined has a negative correlation with these emissions. When viewed at this scale, it would appear that nothing has the potential to make an impact on this problem. However, successful attempts at emissions reduction have been made.

In the first three months of 2020, Germany produced over 50% of its electricity from renewable energy, and since 1990, the country has reduced its CO<sub>2</sub> emissions by almost 25%. In the correlation matrix on the right, the reductive relationship between Germany’s renewable electric production and CO<sub>2</sub> emissions can be seen. Notice also that Germany’s total electric consumption as a whole is also associated with decreased emissions. The contrast between the two matrices illustrates the difference between approaching the wicked problem of climate change from a global perspective, where no solution appears effective, and focusing on a smaller scope where specific social, logistical, political, and cultural needs can be simultaneously addressed. This more directed approach may prove to be the best course of action for avoiding a global temperature increase of 4°C.

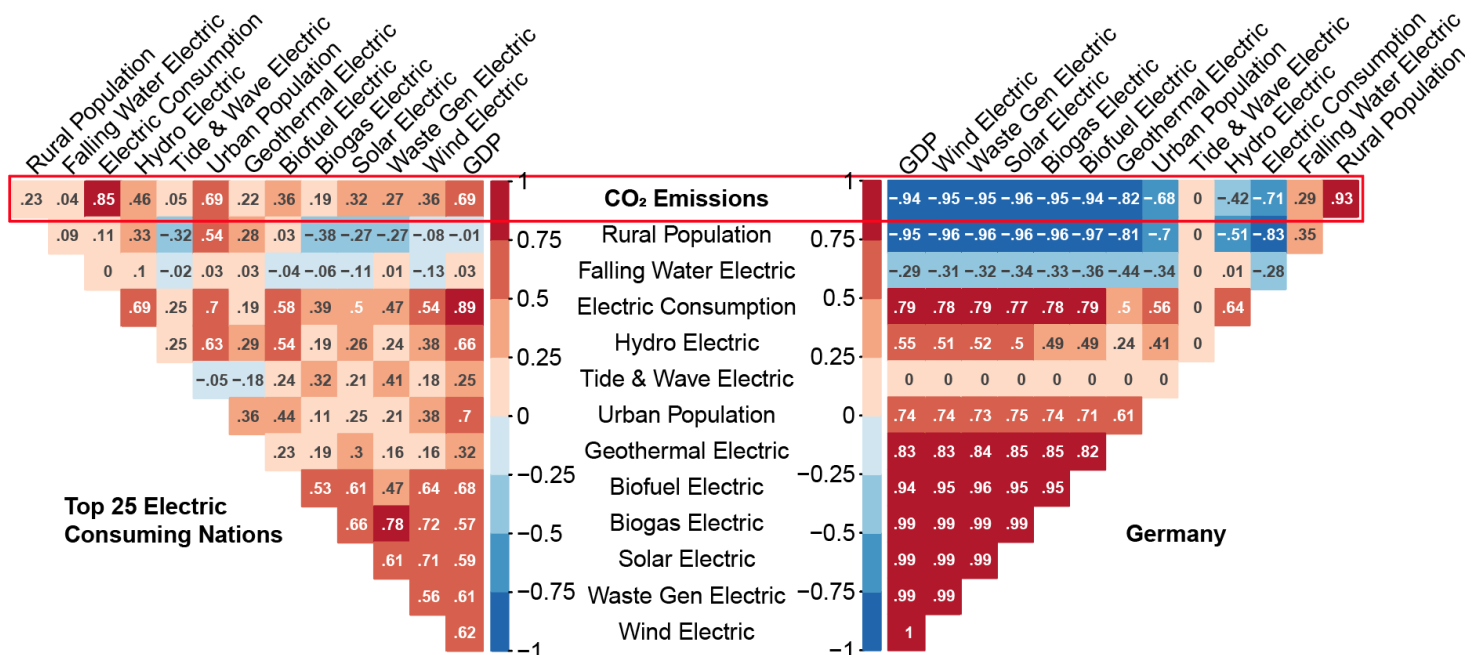


Figure 1 - Correlation plots with selected variables for the top 25 power consuming nations compared to Germany for the period 1990 to 2017.