The emission of greenhouse gases is the primary source of environmental degradation leading to climate change. The gases released by one country create externalities that affect all other countries since the effects of pollution are not localized. Several international conferences have resulted in agreements aiming to hold countries accountable for reducing emissions. These conferences have been held with the expectation of limiting climate change to less than two degrees Celsius annual increase in global temperature. A visual depiction of this trend is featured to the right. Before 2005, there were different, scattered international efforts to mitigate climate change. One of the first major agreements was the Kyoto Protocol, signed in 1997, which was widely recognized as a failure in its inability to lead to major reduction of emissions. Its failure can be partly contributed to the debate among countries. Exponentially growing developing economies such as China, India, and Brazil claimed that reduction should be confined to the developed world, arguing greenhouse gas emissions were vital to their success in growing their GDP, and do not want their growth to be restricted by these restraints. This thesis analyzes the measured change in emissions since 1990 across over 100 countries to determine how the GDP of a country in 1990 and the change of GDP since then affect the change in emissions. The results of these numbers since 1990. All data are collected from the World Bank, which is obtained from the Organisation for Economic Co-operation and Development (OECD). This analysis aims to contribute to research on the progress of limiting greenhouse gas emissions and conversion to renewable energy sources. It also draws attention to the relationship between emissions and GDP as major emerging market economies are likely to be the largest source of future emissions. They can choose to develop using technologies that are more environmentally friendly than the technologies that have been used historically.

### Conclusion

The main regression results are presented above. The first column of the first table displays the results with the current greenhouse gas emission levels as the dependent variable with the 1990 levels and no percent change variables. The coefficient indicates that if the oil production of one country is 1 unit (thousand metric ton), higher current greenhouse gas emission increases by 9.023 kilotons. GDP per capita from 1990 is insignificant in this regression. The second regression on this table depicts the results when percent changes are included. The R-squared increases to 0.387 meaning that 38.7% of current greenhouse gas emission can be explained by the independent variables in this study. Here both GDP per capita variables, 1990 value and percent change, are statistically significant. The coefficient indicates that if the per capita GDP of one country in 1990 increases by $1, current greenhouse gas emissions decreases by 0.127 kilotons, this is a holding constant percent change in per capita GDP constant. The coefficient indicates that if current percent change increases by 1 percentage point then current greenhouse gas emission increases by 6,132.12 kilotons. The mean of greenhouse gas emission is 238,126 which is about 2.33% of the average global temperature. Since this is holding 1990 levels of per capita GDP constant, this relationship effects the impact that economic growth has on greenhouse gases. The results of the regression in column 4 show that countries that started with a higher per capita GDP have a smaller percent change of emission while countries who have high percent growth of per capita GDP are emitting more. The regressions depicted on second show the results when the dependent variable is the natural log of current levels of greenhouse gas emissions. The purpose of this is to obtain exponential growth of emissions. This analysis is consistent with the previous model. The most significant coefficient results from the final regression are that of percent of energy that comes from renewable sources in 1990. The coefficient indicates that with a one percentage point increase of energy coming from renewable sources, percent change of per capita GDP increases by 1.19 percentage points, significant at the 7% level. This result provides evidence that conversion to sustainable energy sources does not have a negative effect on growth of per capita GDP. The increase use of sustainable energy sources has a positive correlation with GDP growth, even when controlling for initial level of per capita GDP.