Conclusion

The initial goal was to create a computer algorithm in the form of a Python script to efficiently and precisely calculate the carbon footprint of a city. The first step was to research on what a carbon footprint was and how it was measured. Afterwards, the details of greenhouse gases and their units of measurement on conversion was studied, followed by reading the book, *How Bad Are Bananas: The Carbon Footprint of Everything* by Mike Berners-Lee, in order to gain a further, more in-depth understanding of the subject. In addition, a small database containing the carbon footprint data of several items and processes was created with Python. Next, the methodology of measuring a carbon footprint was studied which allowed for further insight into the practice of measuring carbon footprints. The next step was researching on how the carbon footprint of cities are measured, by looking into *The Global Protocol for Community-Scale Greenhouse Gas Emissions Inventories*. Finally, after all the necessary research was complete, the computer algorithm was developed. Overall, this entire project was an introduction to the field of environmental science and the complex process of measuring carbon footprints.

During this project, the main problem encountered was a lack of understanding of the subject, which slowed down progress. Many times, progress was sidetracked during an introduction of a new term or a vital concept that had to be understood. In such occasions, I had to go off course and do additional research regarding an extra topic that I had not anticipated, which would inevitably delay progress. The most extreme case occurred when researching on economic input-output model, where I suddenly found myself learning about matrices to better understand the mathematics behind the technique, so as to be able to apply it. Because of the unfamiliarity with this topic, the rate of completion was much slower than anticipated.

The next step of this project would be to improve and optimize the final computer algorithm. Ideally, the program would be completely automatic, fetching data from online databases and following the precise GCP procedure and displaying elegant and detailed results. In addition, the program would also consider the economic data for a city and use the economic input-output model to calculate the city’s carbon footprint. The results of the two methods would then be compared in a data representation image like a table. This would require more comprehensive research on both the GCP and EIO model, which in turn require even more time.

In terms of sustainability, the project *Measuring Footprints* would help to further raise awareness of the carbon footprints of various relatable items and processes and also add to the research of finding a way to precisely measuring a carbon footprint. In order to be able to lower our carbon emissions, we have to first know where we are at and from there, clearer plans can be made by city councils and the government to take steps to reduce greenhouse gas emissions. This project not only reminds others to be more carbon conscious of their personal choices, but it also allows a view of the bigger picture and where we stand in terms of environmental impact.