

Last semester I completed a research project with three partners for my Gemstone 104 course, which examined carbon as it relates to human energy consumption. This class and its focal assignment, a 50-page research paper, were under the competent direction of graduate student Amy French. For this project we were invited to conduct an analysis of the carbon-energy issue in any of its manifestations during any period of history since the Industrial Revolution (when large scale fossil fuel combustion began). The only stipulations were that we analyze primary sources available here at the University System of Maryland Libraries to create new, original research concerning energy issues still relevant today.

Although we were free to study a phenomenon or event that took place in any location, we were encouraged to focus our research on the Mid-Atlantic region, or even better, here in Maryland, so that we might visit the subject location and relevant local resources such as historical societies. Furthermore, Amy revealed to us that Hornbake library hosted a wealth of state-specific information in the Maryland Room that would be easily accessible and perhaps very useful. Therefore, our team decided to study an issue close to home so that we would have a personal stake in the research, and also so that we could take advantage of the resources that were locally available to us.

After deciding to study Montgomery County, which is where we all live, we did preliminary research and brainstorming to decide how fossil fuels are used in that county and what were the local effects of burning them. Since Montgomery County is not an industrial area, the chief uses of fuel are for powering automobiles and for residential or commercial heating and electricity. Our cursory investigation into the history of the county told us that it had been an almost completely agricultural community until its relatively recent transformation. Therefore we were intrigued by the question of how this quick transformation from a rural county to a densely populated one might have affected its energy use and its carbon footprint.

Having decided on the general theme of our project, we reviewed the literature for ideas and contacted librarians to find out what specific data would be available to us in the libraries. We asked for many things from Ann Hudak of the Maryland Collection at Hornbake, such as home electricity use figures or data on the electricity demands of the county, but the things we wanted didn't seem to exist, besides population counts and development records. However, thankfully Ann introduced us to a very interesting publication made by the State of Maryland every year for at least the past fifty years. These were the annual Maryland Air Quality Data Reports, and they provided us quantitative data about air pollution by including regular carbon dioxide and carbon monoxide measurements (among other pollutants) from locations throughout the county.

We reasoned that home electricity use would not be strongly tied to air pollution, since the electricity is generated by burning coal in a plant very far from this residential county and it is imported by transmission lines, resulting in negligible amounts of local pollution. However, if the pollutants were increasing as automobile use increased, we believed that our analysis would demonstrate an interesting secondary environmental effect of the growth in housing. Therefore, our goal was to demonstrate that 1) there was a significant growth in suburban housing, 2) the rise of suburbs increased automobile use, 3) more cars causes the production of more emissions, and finally, 4) atmospheric conditions worsened due to pollutants that came from automobiles.

In order to prove the growth in housing, we searched for statistics on the matter but came up with nothing. We asked our mentor, Amy, for suggestions, and she told us about Geographic Information Systems (GIS) topographical maps and introduced us to Lara Otis, a librarian at the Architecture Library who explained to us how to find and interpret these maps. In McKeldin one

can find detailed topographical maps of any county in the region, maybe even the whole country. What was particularly interesting in the context of our project was that each map had multiple versions because they are updated every few years. Therefore we were able to look at maps from throughout the period we investigated, 1970-1990, and see where homes and roads sprang up, in what patterns, and approximately when this occurred. Thanks to our librarian we were able to see new highways, new suburban road patterns, and new housing developments, proving our point about suburban growth.

To show the increase in traffic density, we returned to Ann in the Maryland Room, who showed us the Maryland State Highway Administration's data records, which were collected from 1980 on, regarding Average Annual Daily Traffic (AADT) on any road in the state. These data showed impressive numbers, with traffic volume doubling in many places after just ten years.

Some of our most valuable resources were hand-picked for us by our librarians when we explained our research design. They were the backbone of our arguments, although we supplemented them with secondary sources from our literature review, including related statistics at the national level as a basis for comparison to our findings. For this reason I will keep in mind for my future research that a librarian is crucial to find the right sources, because they know what data exists and how to find it, what is unlikely to be found among the stacks, and what remains to be discovered.