

Conducting a Greenhouse Gas Inventory for UNC Asheville

Kelsey Hall
Environmental Studies
Research Advisor: Alison Ormsby

Abstract

Younger generations are ready for climate action. This is especially evident at UNC Asheville, as students openly advocate for environmental issues and sustainability initiatives on campus. Our university identifies sustainability as one of its three core values, and it is time to act on our values. Signing the Carbon Commitment alongside other UNC System schools is a necessary step toward climate action on campus. Implementing this commitment will reduce UNC Asheville's carbon footprint and bring recognition for our actions regarding environmental sustainability. The aim of this research project is to complete two components of the initiative, enabling UNC Asheville to sign this important commitment to climate action on campus. The first component of my research would include collecting and updating data for a campus-wide greenhouse gas (GHG) inventory. The second piece would entail revising and building on the working draft of the campus Climate Action Plan (CAP). The CAP details current and historic emissions and proposes short, medium, and long term project goals for the following areas on campus: food systems, energy use, buildings and infrastructure, transit systems, solid waste and water usage, and habitats and forested areas.

Research Question:

What are UNC Asheville's campus greenhouse gas emissions, and what initiatives could UNC Asheville take to mitigate those emissions through a campus Climate Action Plan?

Anticipated Results:

1. Completed greenhouse gas inventory for the University (using SIMAP software/reporting system)
2. Revised Climate Action Plan
3. Begin to complete AASHE STARS reporting data

Budget:

\$1500: Student stipend
\$400: SIMAP membership fee
\$450: AASHE STARS membership fee
\$65: Books for research (details below)

Total: \$2,415

Sources:

AASHE. (2019). STARS, Sustainability Tracking Assessment & Rating System. The Sustainability Tracking, Assessment & Rating System. Retrieved 3 Feb.

2020 from: stars.aashe.org/

Bollier, E., and A. Ormsby. (2013). Using an Analysis of Greenhouse Gas Emissions and the Climate Commitment To Drive Sustainability Initiatives at Eckerd College, Florida. *Sustainability: The Journal of Record*, 6(2), 115–119. doi:10.1089/sus.2013.9873.

Boswell, M. R., A. I. Greve & T. L. Seale (2010). An Assessment of the Link Between Greenhouse Gas Emissions Inventories and Climate Action Plans, 76(4), 451-462. DOI: 10.1080/01944363.2010.503313.

Second Nature. (No date). The Presidents' Climate Leadership Commitments. Retrieved 7 April 2020 from: secondnature.org/signatory-handbook/the-commitments/.

UNCC. (2012). UNC Charlotte Climate Action Plan 2012. Retrieved 7 April 2020 from: [uncc.edu, facilities.uncc.edu/sites/facilities.uncc.edu/files/media/Sustainability/UNC%20Charlotte%20Climate%20Action%20Plan%202012.pdf](https://uncc.edu/facilities.uncc.edu/sites/facilities.uncc.edu/files/media/Sustainability/UNC%20Charlotte%20Climate%20Action%20Plan%202012.pdf).

UNCC. (2009). UNC Charlotte Greenhouse Gas Inventory. Retrieved 7 April 2020 from: [Uncc.edu, facilities.uncc.edu/sites/facilities.uncc.edu/files/media/Sustainability/GHGReport02%3A07.pdf](https://uncc.edu/facilities.uncc.edu/sites/facilities.uncc.edu/files/media/Sustainability/GHGReport02%3A07.pdf).

Background:

Colleges and universities around the world have been making commitments toward climate action and mitigation for their campuses and operations for years and standardizing the practice of completing campus Climate Action Plans (CAPs) and greenhouse gas inventories (Boswell et al., 2012). Second Nature, a nonprofit organization based in Boston, oversees institutional Climate and Carbon Commitments, collecting data and creating a network of signatories (Second Nature, no date). The Carbon Commitment is a more attainable first step for UNC Asheville than the Climate Commitment. The goal of this research project is to understand global climate change at the campus level and how we can address it, similar to the project by Bollier and Ormsby (2013).

Signing onto this commitment at UNC Asheville is a necessary and important step toward climate action on campus. Additionally, it will place UNC Asheville on track with our peer institutions who have already taken this action, both within the UNC System and the southeast region. To date, UNC Chapel Hill, NCSU, UNC Charlotte, and Fayetteville State have signed onto the Carbon Commitment, and Appalachian State University has signed onto the Climate Commitment (The Presidents' Climate Leadership Commitments, no date). Signing onto the Carbon Commitment and completing the necessary follow-through will make UNC Asheville a more competitive institution for prospective students and will allow UNC Asheville to be ranked on the Princeton Review sustainability ranking and Sierra Club Cool Schools lists. UNC Asheville is already a leader in the state on sustainability and climate action through initiatives such as fossil fuel divestment, the establishment of the Student Environmental Center (SEC), the work of NEMAC (National Environmental Modeling and Analysis Center), the applied research entity on climate resilience, campus-wide composting initiatives, and alternative energy infrastructure such as the ground-source heating system on the quad, just to name a few. This initiative is another opportunity for UNC Asheville to take the lead in this area and highlight the good work already being done on campus. The GHG inventory that I am proposing to conduct will involve collaborating with many departments on campus to estimate the amount of emissions coming from UNC Asheville's campus and

operations, over the past 10 years. Most of this reporting already exists within current departments and operations on campus, but my work will aim to gather this data and update it in order to prepare a cohesive and digestible report that the university can submit to

Second Nature after signing the Carbon Commitment.

Scope 1, Scope 2, and Scope 3 emission categories serve to label the various sources of GHG emissions from UNC Asheville's campus and operations and from the activity surrounding UNC Asheville. Scope 1 includes stationary and mobile emissions. These are emissions from operations on campus and those controlled by UNC Asheville. Examples may include boilers, burners, heaters, furnaces, ovens, dryers, engines, and other identifiable UNC Asheville controlled emissions. Scope 2 includes indirect emissions. This is largely composed of purchased energy. Scope 2 emissions can be defined as GHG emissions required by UNC Asheville that occur at non-university owned institutions, such as the energy purchased by UNC Asheville from Duke Energy. Scope 3 are emissions that are directly financed and/or present within the campus culture via influence and encouragement. Examples would include Study Abroad air travel, staff and student commuting, campus fleet, and prospective student travel (UNCC, 2009).

The CAP will serve as both a necessary piece of work for the initiative, and an important document that can be used internally for a Sustainability Report and in conversations around master planning on campus (UNCC, 2012). The CAP will detail six areas on campus and offer background and proposed initiatives to mitigate emissions in each area in the short, medium, and long term. These areas on campus include buildings and infrastructure, energy, habitats and forests, water and solid waste, transit, and food systems and acquisition.

The intention of my proposed project is also for both of these research components to serve as a basis for the AASHE (Association for the Advancement of Sustainability in Higher Education) STARS (Sustainability Tracking, Assessment, & Rating System) reporting program. STARS is "a transparent, self-reporting framework for colleges and universities to measure their sustainability performance. STARS is intended to engage and recognize the full spectrum of higher education institutions, from community colleges to research universities. It encompasses long-term sustainability goals for already high-achieving institutions, as well as entry points of recognition for institutions that are taking first steps toward sustainability" (STARS, 2019). AASHE STARS goes beyond the greenhouse gas inventory, and aims to include many sustainability dimensions of the entire campus. There are other students, faculty, and staff dedicated to seeing this initiative through after my initial research project is completed. Currently, I am working with a group of students from Professor Evan Couzo's "Communicating Climate Change" course to initiate preliminary research and conversations. A new Climate Analyst position at the SEC has also been approved for the fall semester of 2020 to continue work on annual reporting for the AASHE STARS program. Chancellor Cable and the UNC Asheville administration have already been approached with this proposal in the spring of 2020, and have expressed support for signing onto the Carbon Commitment in conjunction with Bill McKibben's visit, although it has been delayed until Fall 2020 due to the postponement of the McKibben lecture (McKibben, 2008). My personal experience organizing the fossil fuel divestment campaign at UNC Asheville and working for both the SEC and NEMAC have provided valuable knowledge and skills in this area that qualify me to be the student lead on this project.

Methodology:

Scope 1 and 2 emissions will be determined by examining existing university reporting and data and consulting with various departments on campus including (but not limited to) the Department of Sustainability, Grounds and Operations, Fleet and Transportation, Dining Services, and the Study Abroad Office.

The Second Nature SIMAP (Sustainability Indicator Management and Analysis Platform) membership fee will allow access to existing greenhouse gas inventory data for campus that was entered into the system several years ago.

Research will include gathering other university greenhouse gas inventories and deciding on a format that will work best for UNC Asheville's purposes.

STARS reporting will involve using existing Department of Sustainability spreadsheets and consulting with a broad range of departments on campuses through meetings and correspondence, and potentially using surveys to collect data on academic and operational department activities.

Work on the CAP will involve building on and cross checking data and sources of the existing draft from Prof. Evan Couzo's class group.

My final GHG report will be presented to the Department of Sustainability, Grounds and Operations, John Pierce (Vice Chancellor for Administration & Finance), and Chancellor Cable upon completion before the university signs onto the Second Nature Carbon Commitment during Bill McKibben's postponed visit, which is now scheduled to take place on October 28, 2020.

Conclusion:

The outcomes of this research, namely completion of the greenhouse gas inventory, will benefit the University in several respects. It will provide a basis for a university-wide Sustainability Report, which has never been completed before, and lay the foundation to set up the university Carbon Commitment for success. The GHG inventory and CAP can be used by internal campus departments for operations goal setting and master planning to facilitate greenhouse gas mitigation and targeting of fossil fuel-intensive activities on campus that are contributing to the global climate crisis. A commitment to sustainability is a pillar of UNC Asheville's mission statement, and signing on to the Carbon Commitment, and researching these necessary components, is an important way to act on those values.

Timeline:

We will hold bi-weekly meetings with the student and the advisor throughout the research period

May 2020: Acquire GHG data from the Facilities Department and update SIMAP spreadsheet

June 2020: Complete Scope 1 and 2 dimensions of the campus greenhouse gas inventory by collaborating with departments on campus, and edit the draft Climate Action Plan

July 2020: Concentrate on data collection for Scope 3 elements of the GHG inventory. Continue literature review of other campuses' Climate Action Plans and GHG mitigation strategies. In addition, collect data to input in the AASHE STARS spreadsheets

August 2020: Meet with UNC Asheville administration to finalize research and deliverables and begin training new Student Environmental Center hire for the Climate Analyst position

September 2020: Present initial results to the campus Sustainability Council

October 28, 2020: Bill McKibben visits campus and Chancellor Cable signs the Carbon Commitment

October-November 2020: Work on draft of research paper
Second week of October 2020: Turn in "Intent to Submit" to Undergraduate Journal form

End of November: Present at Undergraduate Research Symposium and turn in complete research paper to Undergraduate Journal for review

Future deadlines after this will be completed by the SEC Climate Analyst position, and this research work will aid in preparing for those future tasks to be completed.

(Please see Budget and Sources above, those sections did not fit in this text box.)

Does your project relate to any of the following? Please check all that apply. :: Sustainability

Justification:

SIMAP Membership Fee: This to be used for greenhouse gas inventory data collection and is necessary to the successful completion of my project. The \$400 fee will grant membership and access to Second Nature's Sustainability Indicator Management and Analysis Platform, which contains historic GHG inventory data from the UNC Asheville. Ideally, I'd like to be able to access this resource by June 1 in order to begin my research and updating/compiling existing data. • AASHE STARS Membership Fee: AASHE STARS (The Sustainability Tracking, Assessment & Rating System) also has an important GHG inventory data component associated with membership access. The SIMAP data will be entered into the AASHE STARS account platform, as well. UNC Asheville has yet to successfully complete the full STARS report, though it has been attempted several times through the years. By inputting my research data on this platform, it will serve as a base for the incoming Student Environmental Center Climate Analyst employee to complete this report. Submitting AASHE STARS reporting would also greatly benefit the university by allowing UNC Asheville to be ranked on the Princeton Review and Sierra Club Cool Schools for prospective students. • Conference and Registration Fees (\$100): I have removed this request from my budget, as the AESS (Association for Environmental Studies and Sciences) Summit in New York, which I was initially planning to attend, was cancelled and the Appalachian Energy Summit has been postponed to a later date. There are no other online webinars that would be relevant to my research available at this time that have a fee associated with them.

• Books

Please see titles requested for research below. Prices listed include shipping. Budget for books is also rounded up to account for possible change in used book stock and prices on Amazon.

1. Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming by Paul Hawken (Amazon.com, \$20)
2. A Better Planet: Forty Big Ideas for a Sustainable Future by Daniel C. Esty (Amazon.com, \$25)
3. The Nine Elements of a Sustainable Campus (The MIT Press) by Mitchell Thomashow (Amazon.com, \$10)
4. Sustainability on Campus: Stories and Strategies for Change (Urban and Industrial Environments) by Peggy F. Barlett (Amazon.com, \$10)