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Kryn Dykema March 20, 2019

A Carbon Offset Program for Emory University

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An abstract of
a thesis submitted to the Faculty of Emory College of Arts and Sciences
of Emory University in partial fulfillment
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Interdisciplinary Studies

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Abstract

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In this paper I follow the preliminary stages of developing a program to offset the carbon dioxide emissions associated with Emory-funded air travel. I present these steps as a record of the work I completed as a student employee of the Office of Sustainability Initiatives at Emory as well as a guidance document to be used by other universities or organizations wishing to establish a carbon offset program of their own. As such, I structure my work in three tiers: What one would do to establish a carbon offset program, what I propose Emory do in their own program, and my justification for each element of my proposal. This follows a discussion of the current Greenhouse Gas Inventory of the University and the understanding that Emory will look to emission reduction strategies beyond on-campus efficiency measures. In my proposal I recommend a voluntary, high/low-category reporting fundraising strategy to support the carbon offset program. I also promote a peer-reviewed, local offset type following the VM0008 project protocol for weatherization of heavily energy burdened households. With these elements I portray a blueprint for the establishment of the Emory Carbon Offset (ECO) Initiative and the work I conducted leading up to its inception.

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Acknowledgements

With the sincerest gratitude I acknowledge the tremendous efforts of the numerous professors, faculty, staff, and administrative officials that contributed to this semester's work. It is with great honor that I was able to work alongside such a prestigious committee, working group, and academic peers, and the fortunate nature of my position does not go unnoticed. Special thanks to the members listed here and the years of collaboration we have completed.

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Kelly Weisinger	Assistant Director: Office of Sustainability Initiatives
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Introduction

Now, more than ever, we must take responsibility for the effects of human activity. On October 8, 2018 the United Nations published a special report on climate change and the warming trends across the globe. This report, published from the convention of the United Nations Framework Convention on Climate Change (UNFCCC) in Incheon, Republic of Korea, was approved by the Intergovernmental Panel on Climate Change (IPCC).[1] With the support of ninety-one authors representing 40 countries and drawing from the scholarship of over 6,000 scientific references, the Report is as accurate as it is terrifying.

The IPCC holds a goal of mitigating global temperature increase to less than 1.5ºC above pre-industrial levels, a benchmark that is unlikely to be attained.[2] If global temperatures exceed 1.5ºC, the IPCC acknowledges that sea level rise, changes in weather patterns, viable pathogen networks, and many other implications will likely result. Further, the consequences of these changes will disproportionately affect vulnerable communities– Those in poverty and in developing nations will bear an unequal burden.[3] With this in mind, the IPCC holds that the 1.5ºC threshold will only be maintained with "unprecedented and urgent action"; a feat that requires the participation of all governments, institutions, and capable individuals to take part.

Emory University, as a prominent leader in academics, research, and social engagement, is a prime example of an entity with the means and renown necessary to participate in such

---

[1] Martin, "Special Climate Report." The IPCC is the most globally recognized committee on climate change scholarship. Their reports are cited during the notable, international meetings including the 2016 Paris Agreement (and numerous others). IPCC assessments are foundational scientific platforms from which governments can base global policies and negotiations.

[2] Intergovernmental Panel on Climate Change, "Global Warming of 1.5 °C." "Global warming is defined in this report as an increase in combined surface air and sea surface temperatures averaged over the globe and a 30-year period…by the decade 2006-2015, [20-40% of human populations live in regions that have] already experienced warming of more than 1.5°C above pre-industrial in at least one season." (4).

[3] Intergovernmental Panel on Climate Change.

"urgent action". Emory has a responsibility, as an institution and as a member of the world community, to hold itself accountable for its contributions to climate change. Thus, while faced with the competitive environment of academic rigor alongside the call for climate action, Emory has activated. Thus far, pursuing on campus efficiency improvements has been the primary emphasis of the University's emission abatement plans. Over the 2018/2019 school year, however, Emory has developed a program to pursue strategies to offset the emissions associated with University operations. The success of this ambitious program cannot be achieved by simple means.[4]

In designing the Carbon Offset Program for Emory University and exploring the methods of best practice for this case-specific process my research addresses the unique nature of Emory's carbon initiative from a variety of disciplinary frames: I draw from the environmental implications of carbon emissions, specifically the emissions that are curbed with efficiency improvements within residences. I work within economic systems of the carbon markets to portray a current value system of tradable carbon credits and use this information in conjunction with behavioral analyses of fundraising, donation patterns, and category reporting. For the institutional framework of Emory University, I discuss the policy stipulations that affect the implementation of university initiatives and outline the cutting-edge nature of Emory's carbon reduction strategies. Through this scholarship I present an outline of the process Emory has completed thus far in implementing a carbon offset program and provide justification for the decisions made in doing so. My work includes an assurance of the integrity of the credits

[4] Cartwright and Patel, "How Category Reporting Can Improve Fundraising." 2013. The emissions associated with operations are discussed below but are the specific target of Emory's offset emissions. The offset program is directed entirely to the atmospheric carbon resultant of University air travel.

produced and a clear record of the additionality required to ensure carbon reductions are realized.[5]

In writing this paper I distinguish three individual entities working simultaneously on this project yet playing subtly separate roles. The first is Emory University, the administration of the University and the entirety of the institution; this is referred to throughout as Emory or Emory University and is representative of the organization itself. Emory's Office of Sustainability Initiatives (OSI) is an office within Emory University from which the carbon offset initiative originated. This is the entity that completed most of the ground work for the project in order to present to the University administration a proposed procedure to complete the offsets. This is the heart of the carbon offset project's Working Group. Finally, I, as the author of this piece and a student employee of Emory's OSI, am the party working to document the steps taken by OSI and the University in developing the carbon offset program and provide scholarship to justify and support the nuanced decisions along the way. Further, after persistent urging of OSI and partner organizations, my research has served as the foundational basis of the proposal for establishing a carbon offset program for Emory. The work recorded in this paper is a blueprint of the work I completed through OSI and a culmination of my proposal to the University. Through my research I provide recommendations to OSI to establish a course to create the offset program. With these recommendations OSI evaluates and selects the path most suitable for the University and presents it to the administration for review. Once proposed, the University can grant access to proceed, thus permitting OSI, and the conclusions of my scholarship, to ensue. As will be

[5] Bushnell, "The Economics of Carbon Offsets." "The term additional, when used with respect to reductions or avoidance, or to sequestration of greenhouse gases, means reductions, avoidance, or sequestration that result in a lower level of net greenhouse gas emissions or atmospheric concentration than would occur in the absence of an offset project" (6)

discussed in more detail, the elements presented here are indicative of the progress of the Program's implementation up to February 20, 2019; this date marks my submission of the finalized proposal to the University administration but does not necessarily include the exact decision Emory will come to.

As should be clear, I am consciously drawing on the methods and insights of the fields of environmental science, sociology, and economics, particularly from the subdiscipline of behavioral economics as developed by the Nobel-recognized scholars Daniel Kahneman and Amos Tversky.[6] In each of these areas, I have received training through specific courses that comprise, in part, my student-designed concentration course requirements for my interdisciplinary major focusing in sustainability and urban development.[7] From these studies I have integrated theories to create a comprehensive discussion of the components that contribute to the initiation of a carbon offset program within a university setting. Beyond the single frames of Kahneman's or Tversky's assertions regarding human behavior, or James Bushnell's economic theories of carbon markets, I approach the development of a carbon offset program for Emory from an interdisciplinary lens. As such, I apply the sociological trends of income in the Greater Atlanta Area, drawing parallels with residential energy burdens and the infrastructural maintenance concerns from which they stem. I address energy efficiency repairs with an understanding of greenhouse gas emissions resultant from the current, coal-powered electrical grid, and the global warming potential of atmospheric compounds emitted from this dirty source. Further, on the institutional level, I address the psychology of participating in voluntary donation services, as discussed by Richard Thaler, as well as the implications of effective category

[6] Kahneman, "Maps of Bounded Rationality."
[7] Notable courses that have contributed to this curriculum include ENVS 120 Living in the Anthropocene, IDS 385 Foundations of Sustainability, ECON 315 Economics and Psychology, and ENVS 330 Climatology and Climate Change.

reporting can have on donation sums; a formula developed from the scholarship of Edward Cartwright and Amrish Patel.

While the theories highlighted above remain strong in each of their respective, distinct disciplines, the integration of these insights is imperative in crafting an efficient, verifiable program to offset the greenhouse gas emissions that are associated with Emory University air travel. Through this assimilative approach I have outlined, the following paper highlights the process of developing a carbon offset program for Emory University. This procedure follows the course of implementation, from designing a portfolio of projects that generate offset credits, selecting the recognized protocol for completing these projects, fostering partnerships for the actual realization of the offset initiatives, and unveiling the offset program to the University. I apply these themes specifically to assert the basis for my design:

- The carbon offset program at Emory will be funded in part by the voluntary contributions from Emory faculty, students and staff at the time they purchase a flight through Emory's travel tool; the funds collected by the contributions will be pooled into a Carbon Reduction Fund that will support weatherization and deep retrofitting projects for Atlanta residences.
- These projects will follow the verified VM0008 Protocol: Weatherization of Single Family and Multi-Family Buildings and will generate peer-reviewed offsets to count against the emissions resulting from faculty, student, and staff air-travel.
- The Carbon Reduction Fund will continue in perpetuity, completing weatherization projects in the neediest Atlanta neighborhoods, while maintaining

future plans to expand into other projects with diverse goals for emission abatement.

The research I conducted, and steps presented in this process were completed over the Summer term of 2018 and progressed through the 2019 Spring Semester.

Chapter 1: The State of Emory University

Emory University is advancing as an institution; it is progressing in renown, research opportunity, and global presence while simultaneously undergoing internal expansion and improvement. The mechanisms that facilitate this growth include ground transportation, air travel, improved construction measures, and the expansion of operations in both the University and the entirety of Emory Healthcare. Emory University is embracing its growth, striving to compete with the rigor and repute of peer universities while pursuing ambitious goals that relate to sustainability, environmental innovation, and an overall reduction of the greenhouse gas emissions that result from University operations. This is a trend among institutions, particularly at a university level, but also a pattern that is becoming more regular as an advantageous progression of business practice.[8]

One of the most significant drivers of this trajectory, especially in the realm of college and university settings, is the Association for the Advancement of Sustainability in Higher Education (AASHE). AASHE is an organization that connects faculty, students, staff and administrators of higher education institutions and encourages the progress of sustainable innovation. AASHE is recognized as the first professional organization within higher education to foster and stimulate campus sustainability. Through their work, and the partnerships of organizations like Second Nature[9] and ecoAmerica, AASHE helped create the American College

[8] Intergovernmental Panel on Climate Change, "Global Warming of 1.5 °C." Hoffman holds that businesses, companies and institutions are facing a changing environment of competition, one that promotes emission-conscious action in the face of climate change. "Companies that will find advantage in the emerging climate change market transition are adept at: reducing their GHG emissions by altering products or processes; trading in emission credits so as to capitalize on this new commodity market; or marketing new management skills or technologies that produce less greenhouse gases" (23).

[9] Second Nature, "Carbon Markets and Offsets Guidance." is an advisory organization working between higher education administrations to promote fundamental sustainability measures. The group is noted here but discussed in detail in following chapters.

and University Presidents' Climate Commitment (ACUPCC), a written accord between active members of higher education administrations. This commitment is a paramount agreement between colleges and universities across the United States as they strive for a sustainable and just future. The intent of the ACUPCC is to encourage the collaboration of higher education to work together towards more a sustainable system. This is completed through transparent reporting, greenhouse gas inventories, and strong commitments to emission abatement. As per the ACUPCC initial report,

> ACUPCC institutions set a compelling vision of success by establishing a target date for achieving climate neutrality and evaluate their current reality in relation to that vision by completing greenhouse gas inventories and assessing their current education, research, and community engagement for sustainability activities. They set interim targets to move towards their vision and take short-term actions to initiate the journey[10]

Emory University is not yet a signatory of the ACUPCC but is moving towards a commitment to this agreement with the progress of sustainable development discussed in this paper.[11] By actively engaging in the AASHE community, Emory has, however, set a precedent for itself and for its peers to incorporate sustainability in its mission for development. This engagement led Emory to publish a Climate Action Plan for the University in 2011 with emission reduction goals

[10] Dyer and Dyer, "Strategic Leadership for Sustainability by Higher Education."
[11] Emory University, "A Climate Action Plan for Emory University." In this document the ACUPCC is discussed with the understanding that Emory is limited in reaching carbon neutrality, a requirement for this accord. The Climate Action Plan does note that "development of a peer-reviewed program of offsets may offer an opportunity for Emory to sign the American College and University Presidents' Climate Commitment to achieve net zero carbon emissions" (4)

and target dates as required by the ACUPCC criterion. Thus, Emory University's pursuit of emission abatement is a joint venture into cost savings, environmental progress, and strategic development for the academic and innovative distinction of the University as a whole. Further, the sustainable progress of Emory's initiatives is forward-thinking; with the intention to establish itself among ACUPCC signatories, Emory is actively following the requirements of this accord while continuing to work within its means as a university and as a healthcare institution.

As per the 2011 Climate Action Plan, published by Emory's Office of Sustainability Initiatives, Emory University aims to achieve a 20% reduction in total greenhouse gas emissions by 2020, a 36% reduction by 2036, and a 50% reduction by the year 2050.[12] These quantities are calculated using the fiscal year 2005 as the base year[13] and relates to the 370,528.8 metric tons of carbon dioxide equivalent ($mmtCO_2e$) that was emitted during that reporting period. [14] This is illustrated in Figure 1 below. Given the size and scope of Emory, as reported in the bi-annual inventories published by the University, these ambitious goals equate to a quantified removal of 74,105.76 $mmtCO_2e$, 133,390.368 $mmtCO_2e$, and 185,264.4 $mmtCO_2e$ from the operations of the University by each benchmark date respectively.[15]

[12] Emory University, "A Climate Action Plan for Emory University" (Emory University, 2011).
[13] 2005 is the typical base year across university reporting. This is not uniform across every institution, but is a strong commitment from Emory.
[14] Metric tons of carbon dioxide equivalent is the standardized unit used to measure and report collective greenhouse gas emissions by the Environmental Protection Agency. It is a unit that relates the global warming potential (GWP) of a variety of greenhouse gases to an equivalent emission of CO_2 (with a standard GWP of 1) thus allowing an inventory of emissions to be universally quantified.
[15] Emory University.

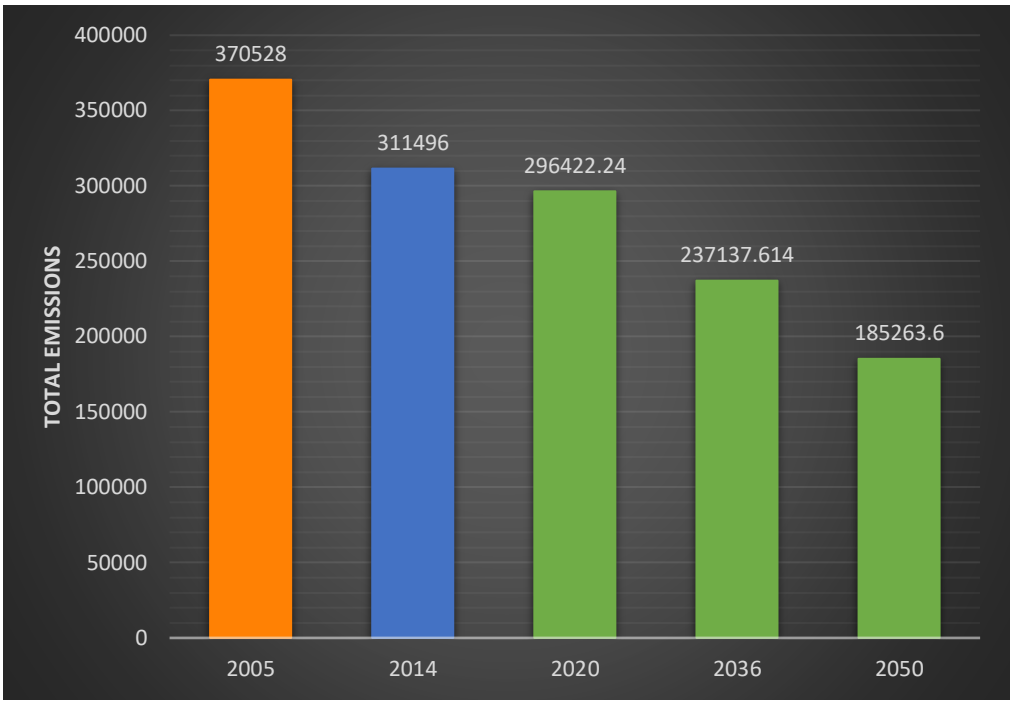

Figure 1. Projected Greenhouse Gas Reductions by Goal. Emory University, "Emory Greenhouse Gas Emissions Inventory FY 2014 Update." The orange column represents the base year, the blue column represents the most current inventory, and the green columns highlight the projected quantities of emissions at each respective goal-year. [16]

The Climate Action Plan goals address the collective emissions of Emory University; a summation of emissions that is the result of a wide variety of sources. Emory University's Greenhouse Gas Inventory reports recognize Cogenerated Electricity, Cogenerated Steam, Direct Transportation, Refrigerants & Chemicals, Agriculture, Purchased Electricity, Purchased Steam/Chilled Water, Faculty/Staff Commuting, Student Commuting, Directly Financed Air Travel, Study Abroad Air Travel, Student Travel, Solid Waste, Wastewater, and Paper as areas of operation that result in measurable greenhouse gas emissions. Each of these categories is

[16] Emory University. This figure compares the base year (2005 in orange), the most recent inventory (2014 in blue), and the projected goal reductions for future years (green).

grouped within three "Scopes" that are representative of a varied level of directness in relation to University operation. While the Scopes of greenhouse gas emissions are clearly defined concepts, Emory University drafted a personalized description of the Scopes of emissions in its 2011 Climate Action Plan:

> **Scope 1**: includes all direct greenhouse gas emissions occurring from sources owned or operated by Emory, such as emissions from burning natural gas, diesel, or gasoline in boilers or fleet vehicles.
>
> **Scope 2:** includes indirect greenhouse gas emissions resulting from the generation of fuels purchased and consumed by an institution. For Emory, these emissions occur at Georgia Power's production plants, where the electricity is generated.
>
> **Scope 3:** includes all other indirect emissions which occur as a consequence of University activities but come from sources not directly owned or controlled by Emory. Examples of Scope 3 emissions include faculty, staff, and student commuting and emissions from landfill waste.[17]

The distinction of emissions Scopes is particularly pertinent in discussing institutional inventories, as the strategies for reducing emissions within each Scope vary greatly.

Scope 1 emissions are typically targeted by on-site reduction measures, efficiency improvements, or policy changes that equate to direct decreases in burnt fuel. Emory has pursued strategies such as reducing the number of miles driven by fleet vehicles, purchasing electric vehicles for on campus transportation, and utilizing a B20 biofuel blend (made from recycled

[17] Emory University, "A Climate Action Plan for Emory University."

cooking oils from campus dining facilities) in campus shuttles. These efforts are within the immediate control of University operations and can be addressed directly with targeted approaches.

Scope 2 emissions are slightly more removed from the internal functions of the reporting institution, and therefore the avenues for reduction are similarly more complex. While Scope 2 emissions are representative of the emissions that result from the fuel burned in power generation, the most prominent method for reducing this category is to decrease the electrical load of the institution. Emory University has instituted measures to reduce its day-to-day operations including participating in the national Better Buildings Challenge in Atlanta with Emory University and Healthcare buildings. Emory has also initiated a temperature control policy which regulates the weekend, evening and holiday thermostat to keep temperature levels cooler in the winter and warmer in the summer. These measures, along with the annual energy competition between buildings (a month-long competition to compare the largest reduction in energy consumption on campus) and the megawatt of annual electricity saved from cogenerated heat and power in Emory's steam plant, are slightly removed in emission source yet are still under the direct influence of the University's operation and policy.

Scope 3 emissions are the most removed types that are accounted for in an institution's greenhouse gas portfolio. These emissions are those that result from the activity of individuals who are employed by the institution but that are not controlled by the entity itself. Because these emissions largely exist outside the reach of institutional influence, Scope 3 emissions represent the most difficult source to quantify as well as to abate. Strategies for Scope 3 reductions can include landfill waste diversion and regulated student, staff and faculty commuting, but are often

difficult to accurately report.[18] For this reason Scope 3 emissions are typically the target of alternative reduction practices, especially within university system comparisons.

Emory's OSI is pursuing rigorous initiatives to limit the amount of its waste stream that is sent to the landfill, but emissions from commuting methods are more challenging to address. Incentives for ride-sharing, public transportation, and sustainable commuting options have contributed to small reductions in specific areas of Emory's overall emission portfolio and have led to significant decrease in overall emissions of the University, especially noted after the 2012 fiscal year's reporting period.[19] These efforts, however, have failed to fully address the emissions associated with air travel from University activity.[20] This trend is illustrated in Figure 2 in a comparison of the sources of emissions that comprise the transportation sector of Emory's greenhouse gas inventory. It should be noted that, while there has been a slight decrease in emissions related to University air travel between FY2012 and FY2014, this is an area of operations that is deemed necessary for Emory to maintain and to build upon its repute as a global institution. Thus, while small reductions can be made in the air travel sector, there exists a limit in the potential for significant decrease.

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[18] Patchell, "Can the Implications of the GHG Protocol's Scope 3 Standard Be Realized?," 3. Patchell states that "compliance to emission data requests" of Scope 3 emissions reporting data has been limited in a survey of numerous firms, NGO's and institutions thus holding that Scope 3 emissions present the most difficult reporting category.

[19] Emory University, "Emory Greenhouse Gas Emissions Inventory FY 2014 Update." "Available data suggest for FY 2014 that Emory faculty and staff reduced commuting emissions by 25.7% from 2005 levels" (7)

[20] Emory University. "Emissions resulting from Emory-financed air travel have significantly increased and are particularly difficult to reduce given Emory's commitment to global research. During FY 2014, Emory recorded 22,656.8 MtCO2e in financed air travel. This represents an 85% increase in directly financed air travel emissions from 2005 levels of 12,260.4 MtCO2e" (7)

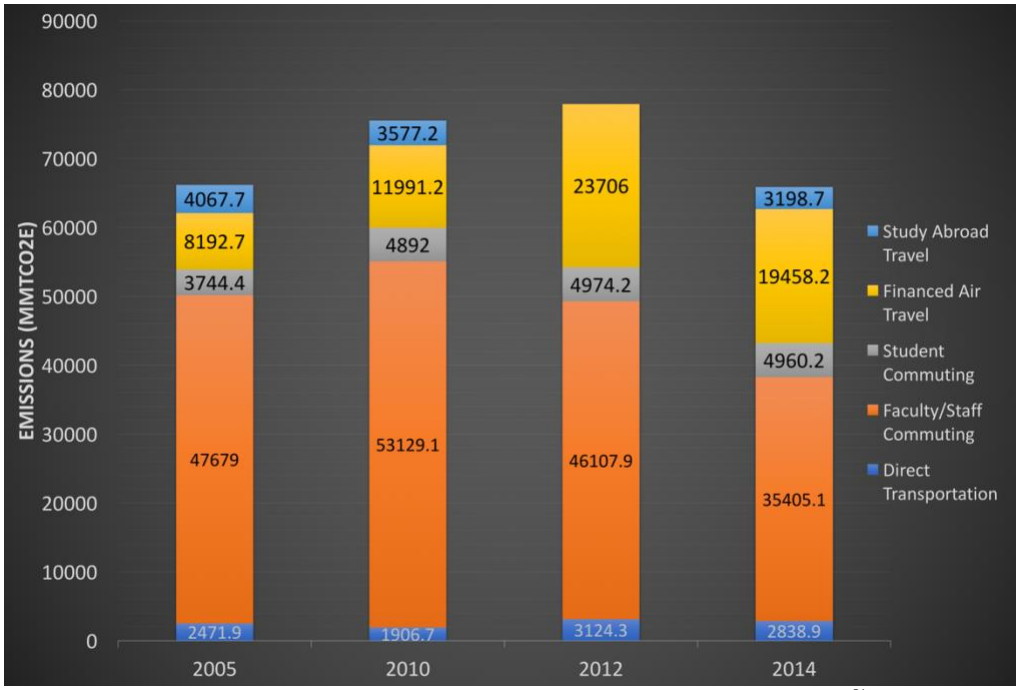

Figure 2. Emory University Scope 3 Emissions by Source. Emory University.[21]

The reality of Emory's limitations in greenhouse gas abatement from on-campus efficiency measures has encouraged the University to investigate a variety of alternative practices outlined in the discussion of Scope 3 emissions above. With a restricted ability to directly reduce the emissions associated with University-financed air travel, Emory has turned to the concept of carbon offsetting to achieve its ambitious climate action goals. This decision has taken the form of an initiative undertaken over the 2018-2019 school year in which Emory University developed a carbon offset program to target the emissions that result from faculty, student and staff air travel; this process, inherently composed of complex disciplinary challenges, is the functional component of the interdisciplinary research recorded in this paper.

[21] Emory University. This table illustrates the collective emissions that compose the Transportation Sector of Emory University's Greenhouse Gas Inventory. Please note that in 2012 Study Abroad Travel and Financed Air Travel categories were combined; the sum of these quantities is shown under the Financed Air travel section in the column.

Chapter 2: Carbon Offsets at Emory

Emory University is a liberal arts university but maintains strong recognition as a research institution. It exists as a university–Emory is comprised of an undergraduate college and seven satellite graduate schools, as well as a world-renowned hospital. With such diverse pursuits and priorities within Emory's corpus, the University exhibits a plethora of ideals, identities and focus areas. When designing a carbon offset program for Emory, a wide array of sentiments was considered and discussed.

A program at Emory must be functional as well as marketable; it must appeal to the general community of the University while actively generating realized, verifiable carbon reductions. It must be additional as well as applicable to the entire Emory population. That is, Emory's carbon offset program must effectively contribute to reducing greenhouse gas levels in the atmosphere in a manner that must engage the students, faculty and staff in an opportunity for education and participation in the program. With these implications, Emory's OSI Carbon Offset Working Group opted to progress towards the establishment of its program in a portfolio format. The portfolio is based on the Three Pillars of Sustainability: Social, Economic, and Environmental Action. Its intention is to pursue emission-reducing projects that fit each of these three areas. While weatherization and deep retrofitting processes fit well into the social frame, there are other realms of activity that can contribute to a sustainable society. The portfolio is designed to reflect Emory's commitment to sustainability as well as to address all aspects of sustainability that exist in the world's cultural environment today.

The Working Group chose the portfolio approach to include both educational and aspirational opportunity as co-benefits. By incorporating intended projects in all three Pillar areas, the project is able to appeal to the vast and various interests of the Emory community, thus

stimulating an inclusive, cohesive initiative. Further, by laying out a plan for future projects (even if roughly outlined) the Working Group has crafted an aspect of growth potential into the earliest design of the program. While it is only practical to begin a carbon offset program by focusing on a single carbon reducing project, the prospects for pursuing diverse projects once the offset program is sufficiently established are promising. Figure 3 illustrates each Pillar of Sustainability and potential projects that fit under each category.

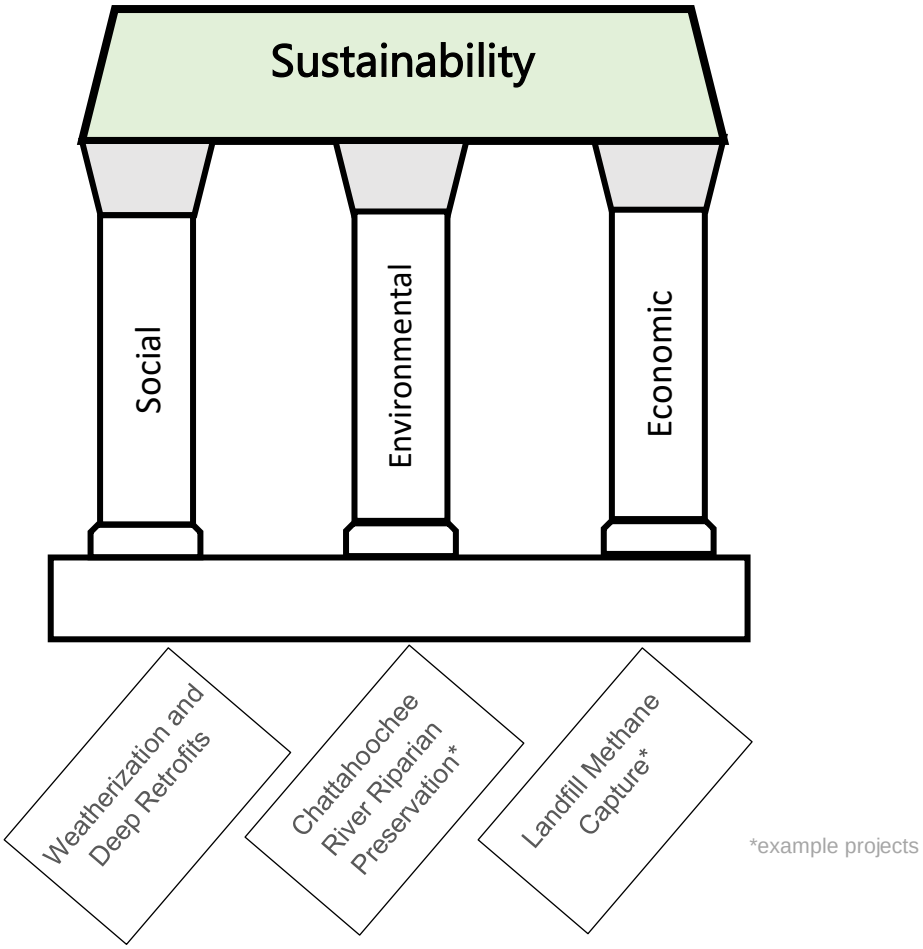

Figure 3. Pillars of Sustainability Example Projects.

The avenues that require action for the implementation of a carbon offset program are bifocal. There is the project itself, the logistics associated with its selection, design, and undertaking, and there is the institutional component. The latter must reconcile the effects of the carbon offset with the goals and aspirations of the University itself. This includes fundraising, collaborating with existing university platforms (budgets, flight booking tools, department policies, etc.), and appealing to the collective Emory community. In the former, the carbon-reducing project must be developed so that actual carbon reductions must be realized. Both action areas are equally important in the process of establishing a working offset program and must be pursued simultaneously. The following outlined steps are differentiated but were completed in tandem; it was imperative that the timelines run parallel for the success of each.

I) Establishing a Lasting Fund

The very basis of the carbon trade, and offsetting greenhouse gas emissions through this market, is the ability of entities to facilitate projects that reduce carbon dioxide (or CO_2 equivalent)[22] from the atmosphere. In order to complete this task, there needs to be sufficient financial support to enable ownership of the projects and to establish Emory as the party responsible for its enablement. Thus, the Office of Sustainability Initiatives and the Carbon Offsets Working Group must establish a Carbon Offset Fund to set aside a pool of resources specifically for the purpose of enabling carbon-reducing projects and generating verifiable carbon credits to reduce Emory's carbon footprint.

[22] Carbon Dioxide equivalent is a metric used to compare greenhouse gases. This is done by equating the Global Warming Potential (GWP) and comparing it to the CO_2 baseline thus allowing different substances to be compared equally.

The components of the Carbon Offset Fund are simple, but the sources of the assets are more complex and the strategies for generation are very diverse. There first needed to be the Fund itself, with sufficient resources to remain operational over time. Then there must be the recurring contributions to the Fund; these were designed to directly address the air travel completed by Emory affiliates. The fundraising plans, efforts to stimulate participation, and calculation tools are discussed individually below. Further, I explain the rationale for each strategy presented, and highlight the calculation methodology for offset pricing.

The Initial Fundraising

Initial fundraising efforts can be more broadly targeted than subsequent strategies to encourage participation by individuals. The earliest fundraising campaign should be designed to simply collect enough overhead to enable the selected weatherization project. Methods used to stimulate fundraising differ, however, and various strategies can have diverse levels of success. The initial fundraising campaign for Emory's Carbon Offset Fund should include the usual practices: Approaching alumni, applying for grants, working within the University budget, etc., but, from my recommendation, also employed a category reporting strategy that was found to increase fundraising levels in every studied scenario.[23] This approach stemmed from the scholarship of Edward Cartwright and Amrish Patel in their discussion of category reporting and its effectiveness as a fundraising practice. In their study, the authors test high and low thresholds for reporting. That is, offering a donation option larger than the target amount with the intention of drawing generous donors to a larger donation amount or by providing a lower option to

[23] Cartwright and Patel, "How Category Reporting Can Improve Fundraising." The term category reporting refers to the practice of providing optional donation amounts for participants to select from and to publicly report the donors that contribute in the different category ranges. For example, offering $10, $20, and $50 donation options and publicly thanking contributors who donated in the most generous category.

encourage donors who are less likely to give, allowing recognition for their contribution as well. This would occur by increasing the donor's utility (termed "esteem" in the article) from the acknowledgment they receive for donating in the higher threshold, or for being recognized at all if they select the lower frame.

Cartwright and Patel found that, while both strategies were effective in increasing the overall donation levels, the lower threshold strategy had a higher potential to encourage contributions.[24] Thus, when designing an effective campaign to initiate the Carbon Offset Fund, I propose to the Working Group to employ a category strategy to emphasize a lower threshold approach. It should be noted, however, that categories above the target donation were included in the option platform, but the emphasis remained on a lower threshold for reporting. The calculation and presented category frames are explained below.

Cartwright and Patel support their findings regarding the effectiveness of both high and low category thresholds, but maintain that, "It turns out, however, that we are able to obtain a definitive result showing that a low threshold can always increase the expected donation. The only thing we require is concavity of the miserly [those less likely to donate] type's intrinsic payoff function."[25] This function is far more difficult to recreate outside of a modeled setting, let alone to replicate across the entirety of Emory University. Thus, the donation strategy employed by Emory University took the basic findings of Cartwright and Patel (that all category reporting increased overall donations, but low threshold typically was the most effective) but generalized the donation quantity function and resulting categories. This approach allowed for simplicity and transparency in the donation categories provided and enabled the Working Group team to work

[24] Cartwright and Patel. "A low threshold does lower the donation of a generous type, but in so doing makes it easier for a miserly type to appear generous. The extra donation of the miserly type may be enough to offset the loss from the generous type." (74)
[25] Cartwright and Patel. (78)

high and low thresholds into the category platform. As such, the reporting strategy I designed focused on inclusivity of both miserly and generous donators (terms used by Cartwright and Patel) and stimulated full participation of Emory affiliates.[26]

While the offset program for Emory is targeted to counter the emissions resulting from air travel, the collective emission portfolio better reflects the activity of the entire Emory community. As such, the net total of greenhouse gas emissions of the University, 311,496.7 mmtCO_2e in 2014,[27] was used in calculating the estimated per-person emission footprint. This was compared to the 33,026 individuals comprising the most recent census of the entire Emory population. Dividing these numbers produces a per-capita emission portfolio of 9.431 mmtCO_2e for each member of the Emory community.[28] From this quantity we are able to compare the average price of a single metric ton of carbon dioxide for the purpose of calculating the target donation amount for each contributing participant.[29] At the time of writing this paper, one metric ton of carbon dioxide is trading at a price of $15.10 in the state of California, but has fluctuated between $14 and $15 in the Spring of 2018.[30] For the sake of simplicity, I incorporated a flat-rate price of $15/ mmt$CO_2$e when developing a target donation amount. Thus, with the following calculation, a per-person target donation was calculated for Emory's initial fundraising campaign.

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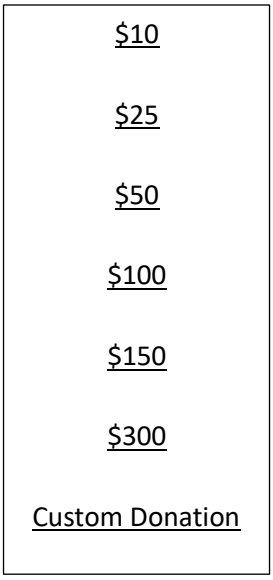
[26] Cartwright and Patel.
[27] Emory University, "Emory Greenhouse Gas Emissions Inventory FY 2014 Update."
[28] Emory University, "Facts and Figures About Emory | Emory University | Atlanta, GA." As of September 1, 2018 this number reflects the total population of Emory University and Emory Healthcare. It is understood that the total emissions of Emory University are not proportionately resultant from each member of the community, but this assumption is made to illustrate the scope of the University's footprint.
[29] Kennedy, Obeiter, and Kaufman, "Putting a Price on Carbon: A Handbook For U.S. Policymakers." Typically in cap-and-trade systems the price of carbon dioxide equivalent fluctuates with the market price of the commodity. This is an economic market as any typical trade of goods or services.
[30] "California Carbon Dashboard." This is a live-updated market projection of the California cap-and-trade market. It is published by the California Air Resources Board in real time.

Dividing the total quantity of carbon emissions by the population of the Emory community yields the 9.431 mmtCO_2e/Emory affiliate noted above, which is then multiplied by the average price of carbon yielding the following equation:

$$Optimal\ Target\ Donation = \left(\frac{311{,}497.7}{33{,}026}\right) x\ \$15 = \$141.47$$

While $141.47 represents the optimal contribution from Emory community members, it is unrealistic to assume that every student, staff member or employee will be willing, or have the means, to contribute this amount. Further, this price reflects the theoretical, annual, per-person cost of Emory's Greenhouse Gas Inventory; a metric that is not made equally responsible across Emory Community members. This lofty quantity, and associated price-tag are beyond the donation range of Emory University's fundraising campaign. Thus, the Working Group opted to employ a category reporting campaign that provided high and low thresholds to encourage broader participation. The process remained centered on the target quantity but presented alternative categories in tandem.[31] With this procedure Emory employed a 7-tiered donation prompt with the following categories.

[31] The thresholds presented were heavily focused on lower threshold quantities and included a custom amount to allow all threshold potential to be accessed.



Offsets in Perpetuity

Once the initial Carbon Offset Fund was established, the true nature of Emory's carbon offset program could be realized. The intention of the Fund is to directly allocate the contributions from members of the Emory community who purchase flights for Emory-affiliated trips to offset the specific emissions those trips emit–The donations into the Fund will directly correlate with the offset emissions. With this intention, the dollars donated to the carbon reduction projects are received from those who are most directly responsible for the air travel emissions. Thus, the quantity of offsets supplied are a direct result of the flights completed and the resulting carbon emitted.

Ensuring direct contributions to the fund equate to a quantifiable sum of carbon credits is as simple as providing a calculator to quantify the emissions resulting from a flight. This calculation analyzes flights booked by Emory community members and the associated cost of that pollution. When faculty, students, and staff purchase a flight through Emory's online booking system, they are presented with a quantity of carbon dioxide equivalent that that flight

will emit. This quantity is expressed in both mmtCO_2e units and dollar value and is calculated via a tool based on the IPCC calculation process. Emory's tool is designed to calculate a base emission for each flight booked yet remains simple for the first stage of the Emory's offset program.[32] As a pilot initiative, the tool provides set categories of flight distance and associated emissions; highlighted categories are represented in a formula developed by IPCC counsel and employed by some of the most notable carbon offsetting organizations and networks.[33] The equation employed by this tool is as follows, and the specific components of the formula are discussed below.

$$Total\ Tons\ of\ CO2\ Produced = Flight\ Miles\ Traveled\ x\ Flight\ Emission\ Factor\ x\ Radiative\ Forcing\ Index$$

While the first two elements of this formula, total CO_2 tonnage and flight miles traveled, are familiar, the emissions factor (EF) and radiative forcing index (RFI) may be less so. These concepts are more technical components specific to air travel than is necessary to discuss in depth here, but they play an important role in distinguishing the actual impact of a single flight.

As per the IPCC Report on Aviation and the Global Atmosphere, "Radiative forcing is a measure of the importance of a potential climate change mechanism. It expresses the perturbation or change to the energy balance of the Earth-atmosphere system in watts per square metre (Wm-2). Positive values of radiative forcing imply a net warming, while negative values imply cooling."[34] That is, radiative forcing measures the warming or cooling potential due to an

[32] E. Penner et al., "IPCC Special Report on Aviation and the Global Atmosphere." The tool is simplified with the pre-established emission categories but is planned to become more comprehensive as the tool is used more regularly and its rule more normalized. A projected future application of the tool would provide a specific emission equivalent per flight and would assign a direct price for that flight individually.
[33] notable names such as the Offset Network, SecondNature and NativeEnergy.
[34] E. Penner et al., "IPCC Special Report on Aviation and the Global Atmosphere." (3). Different fuel types, the atmospheric conditions that the flight travels through (relative humidity, temperature of the airmass, cloud thickness

event or instance of anthropogenic combustion. In this case the "event" would be the individual flight being purchased.

Emissions factors, on the other hand, are the emissions specific to the event; this has no concern for the climatic effects of those emissions. The United Nations Framework Convention on Climate Change (UNFCC) defines the concept of an Emission Factor as "the average emission rate of a given GHG for a given source, relative to units of activity" and applies metrics for calculating EFs of all fuel types, transportation methods, and combustion operations.[35] This framework is an important aspect to calculate the true climatic effect of a specific flight, particularly the different influences flight duration, direction, load, etc. have on the efficiency of the flight.

To illustrate a baseline for the average flight distance, associated emissions, and the per-flight cost to offset these emissions, I compare the total annual number of flight segments purchased by Emory University with the population of the University itself. These quantities are 35,047 segments and 33,026 persons respectively.[36] In fiscal year 2014, the University purchased 1.06 flight segments per Emory community member.[37] Multiplying this with the $15 base-rate of carbon dioxide equivalent yields a target donation of $15.92 per University member to allocate specifically for 2014 flight quantities. This dollar value serves as the foundational target donation for at-the-time-of-purchase contributions to Emory's perpetual fund.

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or composition, etc.), and the type of aircraft all influence the warming or cooling potential of the atmosphere. These components are extremely subjective and difficult to quantify, thus are generalized to the most accurate degree possible for Emory's purposes.

[35] "Definitions | UNFCCC."

[36] Emory University, "Emory Greenhouse Gas Emissions Inventory FY 2014 Update." The 35,047 segments recorded refers to the number of individual flights (including single legs in a multi-stop trip) for 2014. Emory's inventory recorded 35, 696 segments in 2017, but the calculation here stays consistent with the available 2014 data.

[37] Dividing 35,047 by the total 33,026 population yields a 1.06 estimation of flights-per-person.

It should be noted and highlighted that participation in Emory's carbon offset program is purely optional in its infant stage. After a year in operation donations to offset flight emissions will become obligatory, but for the initial release of the program donations to the fund will be left to the discretion of the purchaser. Faculty, students and staff purchasing flights through Emory University see, at the time of purchase, the full cost of their flight along with an additional fee representing the cost of that fight's emissions. The purchaser is then given the opportunity to opt-out of paying this fee, thus employing the voluntary participation strategy most conducive for successful donation campaigns.[38] This approach was developed with consideration of the theories of behavioral economics and the human tendency to remain with the default option.[39]

In its initial effort, Emory's OSI presented a calculation tool intending to educate and to provide a representation of the basic emissions associated with flight. Thus, while a $15.92 donation would be the optimal value received by traveling individuals, flight specific amounts are used to better reflect the actual trip purchased. As such, set emissions and associated prices are used to calculate a recommended donation to offset the emissions associated with the purchased flight. This calculation differentiates between local flights (<500 miles or short-haul flights), domestic flights (>500 miles but within the United States or "medium-haul trips"), and international flights or "long-haul trips" that cross national boundaries.[40] The Center for Corporate Climate Leadership of the EPA cites the UNFCC definition of, and calculation methodology for, emission factors to provide an average CO_2 EF of 0.496 lbs./mile, 0.299

[38] Goswami and Urminsky, "When Should the Ask Be a Nudge?" Over the course of eight studies, conducted with 11,508 participants making 2,423 donation decisions, it was found that "default" donation levels increase the rate of donations in fundraising efforts.
[39] Tversky and Kahneman, "Judgment under Uncertainty."
[40] E. Penner et al., "IPCC Special Report on Aviation and the Global Atmosphere." Air travel is differentiated by "hauls" of trips. This distinction is broken into high, medium and low hauls and is associated with an emission factor for each distance of flight.

lbs./mile, and 0.366 lbs./mile for short haul, medium haul and long haul flights respectively.[41] Thus, in using the formula highlighted above, the average EF and RFI are included in the baseline formula employed by Emory University for simplified calculation.

This allows Emory community members to visualize a basic understanding of the impact of their flight and to act accordingly but does not overwhelm the user with calculations. Once the program is more regularly used and familiarized, the complexity of the calculation can be expanded and the voluntary contribution will transition into a per-flight, mandatory fee. This will all contribute to the revolving fund allocated directly to the projects generating offsets for the quantities of emitted carbon.

II) Implementing the Project Itself

Projects designed to reduce atmospheric pollution, and generate carbon credits as a result, are diverse in foci and application. This diversity is illustrated by Emory's decision to pursue a portfolio of project areas and is indicative of the complicated nature of carbon offset project selection. The process of selecting and undertaking a carbon offset project requires numerous decisions and timely planning. For Emory, this process spanned the spring and summer semesters of 2018 before actual implementation of the project was developed in the spring of 2019.

[41] Center for Corporate Climate Leadership, "Emission Factors for Greenhouse Gas Inventories." While it may seem counter-intuitive at first, the shorter flights tend to have larger emissions factors.[16] With a greater percentage of the flight in take-off and landing modes, and a lower-elevation cruising altitude, the overall flight efficiency decreases for shorter trips. Thus, for short-haul trips, the emissions factor item is the higher quantity shown above, and the total tonnage of CO_2 equivalent reflects this for the flight.

For the origination of any carbon offset program there are certain criteria that must be met. The most basic outline of carbon offset requirements is listed by the acronym PAVER, representing the following criteria. Verifiable carbon offsets must be:

Permanent—The reduction must last in perpetuity

Additional—The reduction would not have occurred during business as usual

Verified—The reduction must have been monitored and confirmed to have occurred

Enforceable—The reduction must be counted only once and then retired

Real—The reduction must have actually occurred and not as a result of flawed accounting.[42]

They must have co-benefits and must fit into a category of review that insures the realization of carbon reductions. [43]

The most direct way to ensure the offsets generated are truly representative of a net decrease in carbon emissions is to follow the PAVER standard; this is usually catalogued through a carbon registry.[44] Registry services publish protocols for carbon offset development, outline the requirements of developing institutions along with partner organizations, and provide credible certification for the created offsets. The following chapter outlines the steps and decisions required when selecting a registry and establishing a carbon offset portfolio. Further, I

[42] Duke University, "Guide to Carbon Offsets and Co-Benefits."
[43] "co-benefits" of carbon offset programs can include educational components, social and community engagement, scalability and reproducibility of the project, public partnerships, publicity for other related entities, and many more. This is an important aspect of engaging beyond the singular atmospheric focus.
[44] Carbon Registries include a number of renowned organizations, the most prominent of which are the Verified Carbon Standard (VCS or Verra), The American Carbon Registry (ACR), The Gold Standard, and The Carbon Registry.

discuss the process of finding and adhering to the requirements of the carbon protocols and the various levels of carbon offset integrity.

Select an Offset Type

Carbon offsets, especially at a university level, can vary in the ways they are realized. The ability to quantify such offsets is dependent on the projects that generate them, and the amount of work and resources that contribute to their inception. Typically, there are three standards of carbon offsets, each with differing levels of verification, certification and associated cost. The three items outlined below follow established criteria of the ACUPCC (mentioned earlier) and the guidance of Second Nature.

- Innovative Offsets

  Innovative Offsets are the least regulated offset type and therefore are the least costly for a developing institution. These types of projects are typically smaller than the other offset types and do not require recognition from an existing registry. On campus reforestation, local, small-scale energy efficiency or fuel type transitioning can serve as examples of Innovative Offsets if the scope and reporting of these initiatives does not meet the standards of the other offset types. Innovative Offsets are the simplest offsets to complete, and while they allow institutions to display carbon reduction strategies they may not be recognized by an existing registry. Innovative Offsets are recognized by The Presidents' Climate Leadership Commitments[45] as a method through which research potential and

[45] Second Nature, "Carbon Markets and Offsets Guidance." These are the actually signed commitments of the ACUPCC and the Climate Leadership Network.

educational outreach can disseminate through the network of signatories. These types of offsets can account for no more than 10% of an institution's offset portfolio and must be specifically targeted to Scope 3 emissions.[46]

- Third-Party Verified Offsets

  Third-Party verification is a thorough and extensive process that ensures the highest quality of offset projects. To achieve this verification an institution must develop a project, choose an established registry, follow an accredited protocol (discussed below) and report their process to a third-party consultant organization. This process is costly in both time and budget, and thus is typically pursued by large corporations rather than smaller entities or universities.

- Peer Reviewed Offsets

  Peer Reviewed Offsets follow a standard that is more established than Innovated Offsets but is not as costly as Third-Party verification. This offset type relies on the collaboration of institutions (here strictly confined to universities) that have established climate reduction commitments. Peer Reviewed Offsets must meet all of the requirements of Third-Party Verified Offsets but, rather than employing a consulting firm to verify the offset project and associated data, peer universities can check each other's process to ensure the project's validity. This method is

[46] Second Nature. (33).

very new but is gaining popularity among universities across the country. Emory University will pursue this type.[47]

Offsets for Emory

To address the impetus for pursuing carbon offsets at Emory, the rationale for selecting this particular type of peer-review process, and the overall implications of a ground-up policy change of this nature, I draw from scholarship of political science, specifically from the frame of policy implementation. Stephen Linder and B. Guy Peters provide an excellent foundation in their chapter of Cambridge University Press' *Journal of Public Policy* for the consideration institutions face when implementing sweeping policy. Their work is further discussed by Micheal Howlett and M. Ramesh in their chapter "Policy Instruments, Policy Styles, and Policy Implementation" in *Policy Studies Journal.* Through the assertions I discuss below, I outline a proposed best-practice for Emory University. I outline a manual to appeal to the University as an institution with an extensively wide array of priorities, pathways, and calls for attention. To develop a new policy within such a broad, diverse framework, the justification for the proposed system need be well established. Thus, to suggest a carbon offset initiative to the University administration, the proper environment must exist within the institution to welcome this advancement.

Carbon offsets are by no means a first-resort strategy for the University's climate goals. Rather, as per the Climate Action Plan for Emory, "Emory intends to achieve the carbon reduction goals in this Plan without the use of offsets purchased on the open market. However,

[47] Second Nature, "Carbon Markets and Offsets Guidance."

we recommend that Emory explore options for creating local carbon offsets that can enable the university to exceed its current carbon reduction goals".[48] Only as a supplemental strategy should offsets be used to reduce the emissions associated with Emory University. This goal is clear but, as times have changed since the 2005 publication of this report, so too have the needs of the University's trajectory.

As we enter 2019, the immediacy of climate action is ever more important, and thus the strategies employed by Emory are similarly heightened. As compared to the base-year, faculty and staff commuting emissions are down 25.7% but, as was discussed in the introduction, the emissions from air travel have yet to realize the necessary reductions.[49] Further, with Emory standing at the crux of its progress, limiting the number of flights taken by faculty, staff, for research opportunities is not a strategy conducive to significant progress.[50] While the University maintains the necessity of operations, it opted to pursue offset strategies as an additional emission abatement measure in the wake of the fast-approaching 2020 benchmark year.

Beyond the aspirations of Emory University itself, the carbon offset program's establishment was re-addressed after a second component of the Climate Action Plan was achieved. The Plan included the following stipulation for the concept of carbon offsets, "If such a program of peer-verified offsets is approved by AASHE, Clean Air-Cool Planet, and other organizations overseeing sustainability efforts in higher education, Emory may be able to sign the American College and University Presidents' Climate Commitment (ACUPCC) which would commit the University to net zero emissions in the future".[51] This statement is significant for a

[48] Emory University, "A Climate Action Plan for Emory University."
[49] Emory University, "Emory Greenhouse Gas Emissions Inventory FY 2014 Update."
[50] To reiterate, Emory places an emphasis on telecommuting, e-conferencing, and networking through the internet, but cannot fully justify a limitation on the number of flights taken by University members. To achieve the progress and development of Emory's goals, essential air travel will not be curbed by the University administration.
[51] Emory University, "A Climate Action Plan for Emory University."

number of reasons. The condition indicates that, at the time of publication, the possibility for peer-reviewed offsets was not yet established. Now that this option is an available approach, it presents new opportunities for the University. The statement also signifies that, with the development of the peer-review process, offset strategies are now a viable strategy for Emory to pursue. Finally, the clause presents the avenue through which Emory may seek to enter the ACUPCC and thus solidify its aspirations of a net-zero future. Together these implications highlight the timely development of the national carbon trade and the applicability to Emory's mission. The rationale for this pursuit, drawn from theories of policy implementation, is discussed in the following section.

Discussion

The conditions resulting from changes occurring over the past 14 years have paved the way for Emory University to establish an offset program, or at a minimum have culminated in an environment in which offsets align with the Emory mission. While it may be the case that Emory sits poised to employ carbon offset strategies, it was neither certain nor guaranteed that the University would aim to do so. For this reason, Emory's OSI needed to propose a change to the institutional policy, in a manner that was both appealing to the administrative priorities of the University and the realities of an offset program's implications. In drafting this proposal for OSI, I looked to the scholarship of Michael Howlett and his studies of governmental policy implementation. Dr. Howlett, in his publication titled *Policy Instruments, Policy Styles, and Policy Implementation: National Theories to Instrument Choice*, provides an overview of the components that most typically contribute to policy instrument initiation in a governmental setting. Drawing from the theories of notable political scientists S. H. Linder and B.G. Peters,

Howlett discusses the four most important frames governments address when implementing new policy instruments:

1. *Resource Intensiveness:* Including administrative cost and operational simplicity
2. *Targeting:* including precision and selectivity
3. *Political Risk:* Including the nature of support and opposition, public visibility and chances of failure, and
4. *Constraints on state activity:* Including difficulties with the coerciveness and ideological principles limiting government activity.[52]

With this guidance, I drafted the preliminary briefing for the carbon offset proposal in a manner designed to highlight the needs and priorities of Emory University from the perspectives of Linder's and Peters' descriptions.[53] The proposal outlined the components of the offset program most pertinent for the administration's attention with a special emphasis in each category. Economic resources, construction measures, cost estimates and return on investment for project types were weighed, measured, and analyzed. In this process I landed on the proposal to pursue local, peer-reviewed offsets.

Peer-reviewed offsets are less resource intensive for the University; coming at a smaller cost, but with similar rigor and credibility, the solution provides the largest benefit for the University with the smallest economic burden. Peer-reviewed offsets are targeted; they are

[52] Howlett, "Policy Instruments, Policy Styles, and Policy Implementation."
[53] Linder and Peters, "Instruments of Government: Perceptions and Contexts." In the briefing document I drafted I took special care to touch upon each of the four categories discussed. With each frame addressed, the proposal appealed to the Emory administration in a manner Linder and Peters would deem most appropriate given institutional priorities.

allocated directly for the purpose of reducing the environmental impact of Emory flight emissions and require personal connections with partner entities. The political risk for these offsets is nearly non-existent; while it is preferred to invest in offset projects locally oriented and beneficial, the offset potential has numerous safety layers of security. The investment into peer-reviewed offsets may experience some complications, but there is virtually no risk that the offsets generated will fall through.[54] Finally, there is very limited restraint in the current carbon trade. While Emory may face varied levels of lobbying for or against carbon offsets, the legal ramifications of the carbon market in Georgia are receptive to the peer-review process.[55]

With these claims I proposed the peer-reviewed offset component of Emory's carbon offset program in a manner consistent with Howlett's assertions.[56] Thorough, brief, and with clarity I highlighted the need for offset pursuits given the current climatic and environmental trends and allowed the proposed framework to be easily digested by the policy makers in Emory's administration.

In the following sections I expand upon the project selection, the verification process and the reporting of offset credits that will be generated by this proposal, but here I justify my strategy to urge the University to exercise carbon offsetting strategies, take responsibility for the

[54] A concern for parties pursuing carbon offsets is that the funds raised will not be able to invest in offset-generating projects. This risk is eliminated because of the international carbon trade in which, as a last-ditch effort, an entity can invest in offset projects around the globe. This is discussed later.

[55] Further worries when pursuing carbon offset program, from the perspective of the developing institution, is that the credits generated from the program will not be viable or credible for the institution. This would only occur given the legal environment of the state (if the state in which the projects are completed does not recognize the carbon trade). In Georgia this is not a risk as the carbon market is established and supported by law.

[56] Howlett, "Policy Instruments, Policy Styles, and Policy Implementation." Howlett claims that "in any given situation policymakers will arrive at some mix of preferences for resource intensiveness, political risk, and targetting, taking into account the nature of constraints on state activity… it becomes a matter for decision makers to weigh the different options available and perform their own [analysis]". (8) In my proposal I aimed to address each strength of these categories in a transparent, realistic manner.

emissions associated with its operation, and become a pioneer for climate action in higher education.

Follow a Protocol

Protocol selection is very dependent on the priorities and location of the intended project. While the nature of offsetting carbon emissions is centered around the concept of externally reducing emissions, the site where the actual reductions occur is an important determination. Projects can take various forms and can spread their impact in diverse ways. Wetland preservation easements, reforestation of harvested rainforest, or electrification of shipping fleets, are all examples of projects that could generate credits to offset emissions, but their applicability is clearly different. Thus, selecting a project area is the first step in finding an applicable protocol. Local projects, regional initiatives, or endeavors elsewhere around the globe can all be utilized to reduce atmospheric carbon; the interested institution must simply select *where* the offsets will take effect, and *what* aspect of the project area the credits will address.

It is often most simple and effective for the developers of an offset program to look to past projects for assistance in establishing their own. Carbon registries, the organizations through which the "credit" is reviewed and awarded, maintain stores of previous projects and keep record of the protocols they follow. These protocols can be adapted to suit the specific needs of the infant program but provide a benchmark for the institution to follow as well as a mode of quality assurance for the verifier.[57] Expanding upon the work of previous projects and protocols is often

[57] Second Nature, "Carbon Markets and Offsets Guidance." "Colleges and universities are uniquely positioned to use their academic resources to develop new and innovative protocols and projects that tie back to their research on campus, local community needs, and educational goals. Once tested and established, these new project types can eventually be scaled through existing registries" (34).

the most efficient, cost effective way to undergo carbon offset development. This is explained in Second Nature's Guidebook with the cautionary statement, "while these registries encourage the development of new protocols, it is a rigorous process that can take anywhere from a few months to a few years to complete. Until the protocol is officially accepted by the offset registry, any offsets produced through pilot projects cannot be counted and registered".[58] While the establishment of new protocols is inherently important for the progress of carbon offset prevalence as a whole, pursuing existing protocols is a positive place to start for institutions new to the process. This allows close collaboration with the established parties and allows the carbon registries noted above to assist in project implementation.

Globally, there are many registries for carbon verification but some of the most well-known include Terra (formerly the Verified Carbon Standard or VCS), American Carbon Registry (ACR), Climate Action Reserve (CAR). These organizations have accrued a significant number of project protocols and can provide assistance for interested parties to follow their designs. While many registries exist across the country as well as internationally, the three noted here are the most prominent, and hold the highest regard to date.[59]

Emory's Protocol Selection

When following the process outlined above, Emory's Office of Sustainability Initiatives opted to prioritize the immediate location surrounding the University for its offset pursuits. As such, potential projects pursued to generate credits were required to invest into the Atlanta community in which Emory resides. This selection specifically follows the Office of the

[58] Second Nature. (34).
[59] United States Environmental Protection Agency, "Major U.S. GHG Registries and Their Rules for Coal Mine Methane Projects."

Provost's One Emory Initiative, in which the intentions and actions of the University are aimed to heighten Emory's ties with the city of Atlanta.[60] As is noted earlier, Emory aspires to diversify a portfolio of projects, however, and thus a hierarchy of project types was established to delineate the priority of Emory's pursuits.

- Local: The immediate Atlanta area is the first and foremost project area addressed by Emory. This is intended to foster a collaboration between Emory as a research institution and pivotal entity within its city. A commitment to Atlanta is a primary concern for the University.[61]

- State: If local projects are either infeasible or inapplicable (e.g. Ecosystem restoration or forest preservation projects that may not be present within the urban environment) projects within the state lines of Georgia may be selected.

- Regional: In the case of broad projects that need not be confined to Georgia, endeavors may expand to the South East region of the United States. Examples of this instance include a wetland repair project or riparian health venture that may include riverways that cross state borders.

[60] Emory University Office of the Provost, "One Emory." The One Emory Initiative highlights four target areas for Emory's global impact: Faculty Excellence, Academic Community of Choice, Innovation through Scholarship and Creative Expression, and Atlanta as a Gateway to the World. Each of these action areas is addressed by the local project selection, and this framework was a significant influence in prioritizing this option.

[61] Second Nature, "Carbon Markets and Offsets Guidance." Second Nature outlines the benefits of project proximity with the following statement: "Local projects inherently reduce the risks that accredited programs attempt to mitigate through extensive monitoring and verification requirements, but they also enable environmental and social benefits for campuses' and their surrounding communities" (35).

- International**:** While this selection is far from an anticipated avenue, there is always the option to invest in projects that have no ties to Emory locally but that still contribute to global carbon reductions. This is a common investment for blanket offset programs that target rainforests, infrastructure in developing countries, emissions standards of international vehicles, etc. but do not provide the familiarity Emory wishes to include.

This differentiation serves to better highlight how offset projects can disperse their impact. As a predominant entity in Georgia, and a renowned institution of the United States, Emory is particularly poised to generate a targeted, positive influence. Further, by aiming to pursue projects within Emory's home city, the partnerships required for completion are familiar, the individuals most directly benefitting are accessible, and the quality assurance of the project is readily available; by maintaining an "at home" approach Emory is significantly more involved in the entire process.

Therein lie the impetus to pursue not only domestic projects, but projects that fit the local framework and contribute to the overall wellbeing of Atlanta. Emory's OSI and the Carbon Offset Working group looked extensively into applicable protocol possibilities, project types, etc. and weighed the costs, immediate benefits, and the resultant secondary and tertiary effects. As a preliminary effort, a weatherization and retrofitting project was selected from the stores of previously completed projects overseen by the Verified Carbon Standard.[62] This particular project was carefully chosen for the numerous co-benefits, research opportunities, and community service aspects associated with its completion. Figure 2, found below, is published

[62] The selected protocol is titled, in full, VM0008 The Weatherization of Single and Multi-Family Buildings v1.1 and is listed as a VCS project. The original completion of this project was due to the efforts of the Maine Housing Authority over the 2012/2013 year; this is prior to VCS's transition to the name Verra and thus it is listed as such.

by the United States Department of Energy's Weatherization Assistance Program. The graphic highlights the costs and expected benefits of a single home weatherization.

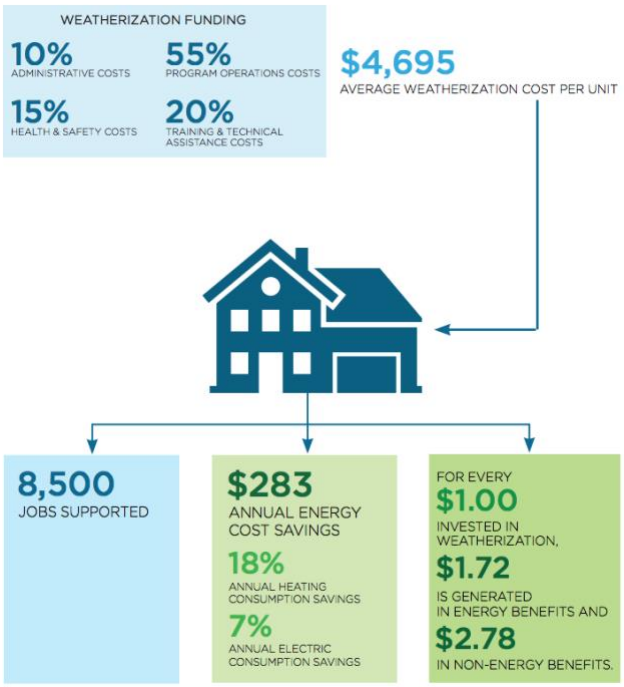

Figure 4. Weatherization Works! U.S Department of Energy[63]

The savings and benefits presented in this diagram need to be further extrapolated for the purposes of the carbon offset program but are effective here to display the variety of impacts weatherization can provide.[64] Beyond the climatic effects of the weatherization improvements, the projects contribute to a growing job market, an alleviated energy burden, and an opportunity for educational progress for residents, for volunteer parties, for potential research partners, and more. The lower right-hand box illustrates this effectively; for every $1.00 invested, the benefits

[63] U.S. Department of Energy: Office of Energy Efficiency and Renewable Energy, "Weatherization Works!"
[64] The 18% Heating Consumption Savings and 7% Electrical Consumption Savings must be further analyzed to equate the lowered electrical demand to a corresponding quantity of fossil fuels that did not need to be burnt, and thus an amount of greenhouse gas emissions avoided. This is explained below.

that are realized are significant in the electrical realm (the area that applies to the offset credits generated) but even more effective in the aspects outside the simple energy benefits. The weatherization project framework is one inherently entwined with a broad-based community benefit.

> Weatherization not only helps households, it also helps revitalize communities by spurring economic growth and reducing environmental impact. Weatherization returns $2.78 in non-energy benefits for every $1.00 invested in the Program (National Evaluation). Non-energy benefits represent tremendous benefits for families whose homes receive weatherization services. After weatherization, families have homes that are more livable, resulting in fewer missed days of work (i.e. sick days, doctor visits), and decreased out of- pocket medical expenses by an average of $514. The total health and household-related benefits for each unit is $14,148 (National Evaluation).[65]

Further, and from a perspective of atmospheric concern, the weatherization project is designed to decrease the energy burden of the residences selected and generates emission mitigation amounts by limiting the electrical demand. Energy demand is directly resultant of a pull from Atlanta's power grid, a resource entirely produced by fossil fuels. By reducing the total demand of electricity, the weatherization project equates to a measurable quantity of electricity that is avoided due to the retrofitting process (comparing the pre-retrofit to post-retrofit audits illustrate the quantity of savings the project amounts to). This electricity, as a bi-product of fossil

[65] U.S. Department of Energy: Office of Energy Efficiency and Renewable Energy, "Weatherization Works!"

fuel combustion, can be equated to a comparable quantity of atmospheric carbon dioxide equivalent that was avoided because of the improved efficiency of the building.[66]

The EPA's AVERT tool is the prominent calculation device to quantify energy efficiency and renewable energy (EE/RE) project's impact on particulate matter. The EPA's publication, *Assessing the Emission Benefits of Renewable Energy and Energy Efficiency using EPA's AVoided Emissions and geneRation Tool (AVERT),* highlights the tool's utility and the methods it employs to quantify the particulate equivalent of EE initiatives for the 10 respective regions of the United States.

> The Main Module uses the expected value of generation and emissions at each load level for each EGU to estimate hourly output both before and after EE/RE. Users enter or choose an EE/RE profile, and the Main Module calculates the before, after, and difference in EGU [electricity generating units] -specific generation and emissions. The differences between emissions resulting from the base year load curve after the adjustment to include the load impact profile of an EE/RE program are the "avoided emissions.[67]

With this program, the EPA recognizes a uniform metric through which weatherization and efficiency improvements can be compared. This is especially valuable for the carbon offset initiative at Emory, as it allows the University to complete the local projects it prioritizes. With

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[66] Fisher et al., "Assessing the Emission Benefits of Renewable Energy and Energy Efficiency Using EPA's AVoided Emissions and GeneRation Tool (AVERT)." The EPA uses The AVoided Emissions and geneRation Tool (AVERT) to quantify quick estimations of the greenhouse gas equivalent that results from improved efficiency. "AVERT calculates displaced emissions based on actual historical hourly patterns in generation by electric power plants within the contiguous 48 states and DC" (1).

[67] Fisher et al. (10).

this ability, Emory can continually evaluate the quality of its generated offsets, play a larger role in the development of the program, and ensure that the process of greenhouse gas reductions is realistically completed.

This is not to cast doubt on projects that fall into the more regional or international scopes, but rather to acknowledge that the credence of the carbon reduction credits is closely associated with the scrutiny under which the project analysis is placed. This examination becomes increasingly more difficult as the developing party becomes more removed from the projects it supports and thus local projects are preferred. The "scrutiny" noted here is discussed in the following section in which I address the verification process for offsetting emissions and ensuring their quality.

Discussion

When presenting the intentions to initiate a carbon offset program to the University administration, the OSI continued the comprehensive proposal of the program's nuances to include the specificity of offset type and location. As with the peer-review choice, I prepared this proposal with the backing of notable research and scholarly justification. After careful consideration, I elected to promote the local option for the project area and emphasize the weatherization and retrofitting project specifically.

The original motivation for my selections stemmed from the One Emory initiative I highlighted earlier but were further justified by the positive externalities associated with these projects in particular. Weatherization projects, when approached from a perspective of behavioral and economic trends, carry underlying implications that prove significant for the purpose of Emory's mission. One Emory looks to promote the wellbeing of Atlanta, establish

Emory as an active contributor to the quality of life in the world, and to evolve the Emory mission to an inclusive, just, equitable environment. Thus, after reviewing the study of Richard Wilk and Harold Wilhite and their particular commentary on the implications that weatherization projects hold, I found this project to be the most aligned with Emory's progress goals.

Wilk and Wilhite hold that basic weatherization installments (weather strip installation, caulking, etc.) are often times foregone expenses in residences, even though the cost savings these measures would provide should make them a rational practice.[68] The author's claim that the source of this irrationality stems in part from the lack of glamor in retrofitting and weatherization improvements, but also due to the societal impression of this type of repair. The authors declare that most respondents in their study "had many other goals for modifications to the home… unless a device, installment or improvement meets some of these other goals in addition to that of saving money, it is unlikely to be adopted".[69] That is, both access to knowledge of the benefits of weatherization and the cost savings thus associated do not play enough of a role in cultural adoption of the practice–Whether it be economic constraints, behavioral misunderstandings, or the less exciting nature of weatherization or retrofitting, the process is not being employed at large.

It then becomes increasingly more apt for an institution like Emory to make weatherization improvements accessible to all communities within Atlanta and contribute to the normalization of its practice. Pierre Clavel and Maile Depp allude to Emory's capacity in this role, as an academic institution, to serve as a catalyst for urban innovation. In their article,

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[68] Wilk and Wilhite, "Why Don't People Weatherize Their Homes?" "[Weather stripping and caulking] are inexpensive, relatively easily accomplished measures that rapidly pay for themselves in terms of energy savings. The situation is intriguing because even though weather stripping and caulking are economically rational, a low percentage of households are doing them" (f-248).
[69] Wilk and Wilhite. (f-256)

Innovation in Urban Policy: Movement and Incorporation in City Administration and Community Development, Clavel and Depp discuss the constraints public governments face in establishing an "innovative" society. The responsibility thus lies with other entities to drive the urban environment in a progressive manner.[70]

In combination, these theories outline important trends in society. The articles I discuss present weatherization as a practice with significant, immediate results but that is considerably under-utilized in society. They note that academic institutions such as Emory sit specifically positioned to contribute to a more innovative, progressive society, and finally, they hold that, as a renowned member of academia, a prominent entity in the fabric of Atlanta, and an institution with special aspirations to contribute to the surrounding community, Emory sits powerfully placed to spread benefits and modernism to all areas of Atlanta and the globe.

Offset Verification

As I discussed previously, carbon offsets fall into three categories of verification, Innovative, Peer-Reviewed, and Third Party Verified. In this description, I also noted that Emory University and the Office of Sustainability Initiatives elected to pursue the Peer-Review option as to maximize efficacy of the offset project in lieu of the costs associated with a third-party review. This process was briefly highlighted in my description of each respective offset type, but the following section explains in more detail the process of verification for peer review. Guidance in this section draws extensively from the counsel of Second Nature, an organization cited in an earlier chapter that represents higher education institutions and works extensively to

[70] Clavel and Deppe, "Innovation in Urban Policy." The authors write that "there is a complex of constituencies, theoretical positions, value commitments, methodology, and incentives that inhibits innovation. What is needed is a counteracting set of these, which academics and professionals can aid and abet" (115). This highlights the roles societal figures have to instigate the governmental changes required for innovation.

promote climate action among academic institutions. Further, I apply knowledge from publications from the Carbon Network, the connected group of the institutions with existing climate expertise or working offset knowledge who collaborate to promote offset program development. These organizations, both bearing significant overlap in mission and personnel, represent some of the paramount players in the realm of carbon offsets in higher education. Figure 5 is an infographic released by the Offset Network and Duke University's Carbon Offsets Initiative. The image outlines the process I explain below.

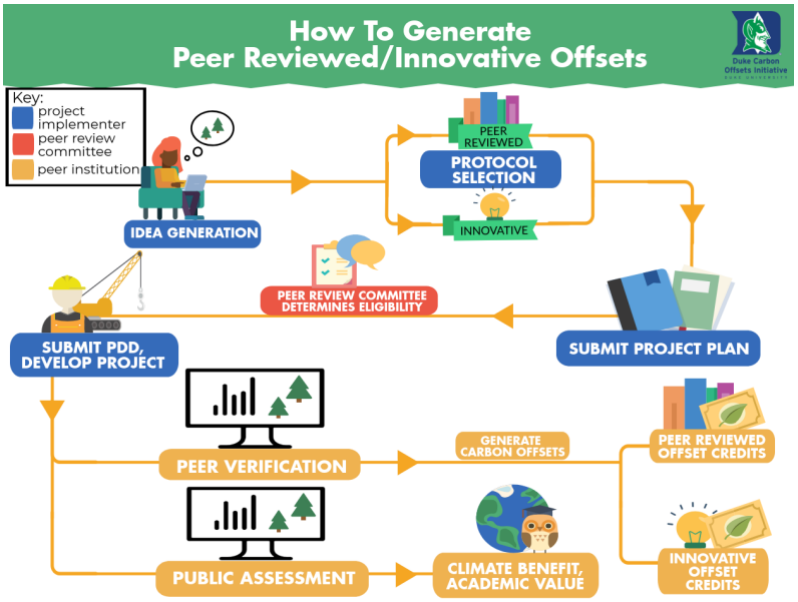

Figure 5. How to Generate Peer Reviewed/Innovative Offsets. The Offset Network.[71]

Following this flowchart one can identify the key players in the program development process and note the strategic role of each. Together the project implementer, peer review committee[72], peer institution, and additional contributing parties comprise the partnerships

[71] "Peer Review Committee."

[72] The Offset Network, 2015. "The Peer Review Committee is a group of subject matter experts in carbon offsets, campus climate goals, or experience implementing offset projects. The committee evaluates submitted Project Plans to ensure projects are eligible for the project pathway selected and also reviews Verification Reports submitted to Offset Network.

required for proper establishment of the program. The following section provides a brief overview of the partner entities required or recommended for project implementation and provides examples in real- world application.

Partnerships

Once the project has been selected and an accompanying protocol determined, the developing institution must work with partner entities to begin the process of actually implementing the project. These partners include local organizations capable of completing steps in the protocol process (tree planting agencies, emission analysts, energy efficiency auditors, etc.) as well as an additional academic institution with the qualifications required to review the project's completion. The peer reviewer is typically a university with close ties to the developing university, and one with an established understanding of climate change, atmospheric initiatives, and the carbon offset process.[73]

Including other universities and organizations with particular knowledge of the emission trading sector is often beneficial as well; many different voices, areas of expertise, or past experiences can only serve to supplement and enhance the development process. This is especially pronounced when the entire mission of Second Nature and the Offset Network is to stimulate a collaborative community of universities set on achieving emission abatement or mitigation strategies. Although it is not required of a university to achieve verification, the formation of a working group dedicated to an offset program design is a popular and inclusive tactic to stimulate strong partnerships between universities and applicable parties as well as to holistically complete the offset generation.

[73] Second Nature, "Carbon Markets and Offsets Guidance." "…for verification, institutions are allowed to consider peer institutions with considerable knowledge in offset projects as a qualified third-party project auditor. In this way, an institution that has developed an offsets project and wants to decrease verification costs, may have a peer institution verify that their offsets meet the principles of high-quality offsets" (34)

When partner organizations have agreed to play a specific role in a university's program, and the developing university has selected both project type and associated protocol, a plan can be drafted to demonstrate the intended project. This plan, presented with assistance of the carbon offset working group, provides a comprehensive blueprint of the proposed project, and the tasks each partner organization will perform. Special care must be taken to fully explain the roles and requirements of the active parties and the specific details regarding the accounting process of a project's efficacy. The plan is submitted to the agreeable peer-reviewing university for evaluation and changes are made if necessary.

This initial review is a crucial step in conducting the preliminary groundwork to ensure the quality of the proposal; with strict accounting tactics highlighted and a detailed rubric for completion, the project can proceed with confidence in its integrity. Once accepted, the project plan becomes a written proposal for development submitted to the review committee and the project can proceed. At this stage, partner developers can complete their respective tasks (tree planting for example) and extensive monitoring of the atmospheric effect is initiated.

The transparency of partner tasks is foundationally integrated into the success of projects and the overall efficacy of the carbon offset program. The partnership process directly correlates with the level of scrutiny under which the project areas are conducted and thus the quality of partnerships runs parallel to the value of the project conducted. Specialized connections have the capacity to dive extensively into their respective, delegated tasks and thus maintain the ability to uphold the rigor of each sectors reporting. Further, the increasingly widespread record of the project's progress, and the outlined responsibilities delegated to each member, leads ever more to the thoroughness of the project-protocol databases; the more diligently each partner conducts their business, the more information is available for future project developers, and subsequently

the quality of the offset trade is improved. The importance of proper analysis of a project's implementation is emphasized in the following section, but the highlighted topic here is the necessity.

Accounting and Reporting

Transparent reporting and sufficient analysis of the project's effect is perhaps the most important step in generating high quality carbon offsets. The entire premise of "offsetting" a carbon footprint is to ensure that a realizable reduction in atmospheric carbon dioxide (or carbon dioxide equivalent) is achieved. The only way to adequately accomplish this task is to take special care in accounting for the projects' impact.[74]

This is the stage in which offset registries play an invaluable role.[75] As the experts in each protocol, the registry or verification body has a series of reporting measures they must keep track of in order to ensure offsets are not double counted (having various parties taking credit for the same offset quantity) and that the reductions are real, justifiable, and additional. Kollmuss, Zink and Polycarp, in collaboration with the Global Carbon Project list some of the most important requirements of the registry process in their publication *A Comparison of Carbon Standards:*

[74] Kollmuss, Zink, and Polycarp, "Making Sense of the Voluntary Carbon Market: A Comparison of Carbon Offset Standards." "Carbon offset registries keep track of offsets and are vital in minimizing the risk of double counting (that is, to have multiple stakeholders take credit for the same offset.) Registries also clarify ownership of offsets" (39).

[75] or, in the case of peer-reviewed offsets, the peer institution takes on the responsibilities of an existing registry.

Registration and Enforcement Systems must include:

- A registry with publicly available information to uniquely identify offset projects.
- Serial numbers for each offset credit generated by each project.
- A system to transparently track ownership of offsets which makes it possible to track each offset to the project from which it originated.
- A system to easily check on the status of an offset (i.e., whether an offset has been retired).
- Contractual or legal standards that clearly identify the original "owner" of emission reductions.
- Contractual or legal standards that spell out who bears the risk in case of project failure or partial project failure (e.g. who is responsible for replacing the offsets that should have been produced by the failed project).[76]

These requirements are specific, yet broad reaching. The reason for any ambiguity is discussed later in *A Comparison of Carbon Standards* as the authors discuss how different registries have slightly different methodologies for obtaining their record keeping. Kollmuss et. al. clarifies, "There is no one single registry for the voluntary market. Registries for the voluntary market have been developed by governments, non-profits, and the private sector. Some of the

[76] Kollmuss, Zink, and Polycarp, "Making Sense of the Voluntary Carbon Market: A Comparison of Carbon Offset Standards." (39).

registries are tied to certain standards whereas others function independently".[77] This is not to say that registries follow vastly different processes, but rather noting that the infant nature of the offset market in the United States still follows the subtly different tactics of each independent organization. For the purposes of my research, and the recommendation I have presented for the VCS protocol type, I outline that standard here. For interested readers I include the following table (Figure 6 in this piece but cited as Fig. 5.71 in the text) from the fifth chapter of *A Comparison of Carbon Standards* in which each registry's approval process is noted.

5.7.1 TABLE 9: ***Registries Used by Each Standard***

Standard	Accepted Registries	Approval Process
CDM	CDM Registry	Verification documents need to be approved by the CDM Executive board
GS	Gold Standard Registry (currently under construction, predicted start date early 2008) For CERs: CDM Registry; GS-labeled CDM serial numbers will be tracked in the Gold Standard registry For VERs: Gold Standard Registry	Verification documentation for CER and VER projects are approved by the Gold Standard Technical Advisory Committee CERs are issued by the UNFCCC and the Gold Standard label is delivered by the Gold Standard VERs are issued by the Gold Standard
VCS	In the process of accrediting multiple VCS registries that are electronically connected and transfer data between each other in real time. All registries will be connected to a central VCS project database which is under development and aiming to launch in March 2008.	Verification documents are approved by the third party auditor.
VER+	Blue Registry of TÜV SÜD	Verification documents are approved by the third party auditor and then forwarded to BlueRegistry administration. All VER+ projects must be registered in the BlueRegistry.
VOS	Is planning to establish their own registry	For GS VERs: see above. For other VOS VERs: verification documents are approved by the third party auditor (DOE)
CCX	CCX Registry	Offset projects need to be approved by the CCX Committee on Offsets
CCBS	N/A	N/A
Plan Vivo	Plan Vivo Registry	Plan Vivo sells ex-ante credits (Plan Vivo Certificates) which are recorded in their own registry
GHG Protocol	N/A	N/A
ISO 14064-2	N/A	N/A

Figure 6. Registries Used by Each Standard. Kollmuss, Zink and Polycarp. 2008.[78]

[77] Kollmuss, Zink, and Polycarp. (40).
[78] Kollmuss, Zink, and Polycarp, "Making Sense of the Voluntary Carbon Market: A Comparison of Carbon Offset Standards."

As can be noted by the above figure, the VCS Approval Process is left to the third-party auditor. In the VCS system, these entities are known as validation/verification bodies (VVBs) and exist as the highest experts in following methodologies for greenhouse gas reporting.[79] In a standard procedure, two VVBs assess a project following an established methodology, specific to each project, and thus ensure a multi-tiered check system. The Verra team uses the following statement to summarize the VVB methodological evaluation. "Methodologies set out detailed procedures for quantifying the real greenhouse gas (GHG) benefits of a project and provide guidance to help project developers determine project boundaries, set baselines, assess additionality and ultimately quantify the GHG emissions that were reduced or removed. Any methodology developed under the United Nations Clean Development Mechanism can be used for projects and programs registering with VCS".[80] Thus, once a project is selected, an appropriate methodology is assigned and the VVB or peer-reviewing institution must follow it extensively to ensure proper reporting and accounting are maintained.

Demonstration of Additionality

The term "additionality" was defined earlier in this paper but, given its importance for the maintenance of offset quality and integrity, I highlight the word again here. To be additional a project must generate an effect that is measurable in both the quantity of emissions that are avoided by the project's implementation and by the fact that this avoidance would not occur without the project's implementation. That is, a project may be associated with a significant

[79] "Verra - Validation & Verification." "VVBs are qualified, independent third parties which are approved by VCS to perform validation and verification. This independent assessment process is critical to ensuring the integrity of the projects registered with the VCS Program" (1).
[80] "Verra - Validation & Verification."

reduction of atmospheric CO_2, but if it cannot be determined that the project itself was the cause of the abatement, or that it was the specific intent of the project to achieve the emission reduction, the project may not be considered additional.[81] An example of this would be an on-campus construction project to renovate an existing building. While the new building may be more energy efficient than the structure it replaced, it would not be considered to achieve additionality unless the entire purpose of the renovation was to reduce the electricity demanded by the building and subsequently mitigating the fossil fuel combustion required for the energy generation.

The intention of the projects included in a carbon offset program are not so much in question as their purpose is already defined. It is their effect, rather, that requires review and analysis to ensure additionality. This is where the importance of accounting (highlighted previously) and regular monitoring play a role. The additionality of Emory's weatherization project is a key concern for the initiation of the carbon offset program and will be a priority for every subsequent project as the program matures. The partnerships, reporting strategies and overall rigor of Emory's program all culminate into the extensive process of Emory's offset verification. The groundwork of such an endeavor was neither easy nor single-handedly conducted; the importance of the collaborative work in Emory's network is imperative here.

[81] Mary Sotos, "GHG Protocol Scope 2 Guidance." This is compared to a business-as-usual scenario thus explained by the author: "the project activity (or the same technologies or practices that it employs) would not have been implemented in its baseline scenario"

An Offset Team for Emory

Emory University's Carbon Offset Working Group is a collaborative effort run almost exclusively between the close ties of Emory's OSI and the efforts of neighboring university Agnes Scott. Emory and Agnes Scott are both pivotal players in the fabric of the Atlanta/Decatur communities and thus their partnership is both natural and cohesive. As prominent figures in and around their respective campuses, both Emory and Agnes Scott feel the necessity to broaden their societal impact and explore the community-beneficial offset projects locally. Each, with continually growing prowess in the carbon offset sphere, has agreed to serve as advisors in each other's programs, and has pledged to act as peer-reviewers for the projects conducted.

While the scope and breadth of the offsets required by each respective institution vary (the size of Emory is significantly larger than that of Agnes Scott and thus the greenhouse gas portfolio is similarly inflated) the mission and priorities are very conducive for partnership. A team of representatives from Agnes Scott and parallel personnel from Emory make up the heart of the Working Group for the offset program at Emory.

Externally, Emory is exercising relationships with local non-profits, humanitarian groups, and forestry servicing entities to assist in the completion of successful carbon offset generation. While Agnes Scott represents a partner in academia, Emory also enjoys strong ties with the Atlanta not-for-profit organization the Southface Institute. The mission of the Southface Institute is to "promote sustainable homes, workplaces and communities through education, research, advocacy and technical assistance".[82] As an active player in the progression of a sustainable Atlanta, the Southface Institute maintains the capacity, the expertise, and the mission

[82] "The Southface Institute." Home Page.

to effectively conduct energy audits of residences, provide comprehensive feedback and efficiency strategies, and complete an analysis of the impact the weatherization project accounts for. This is a pivotal role in the weatherization project, and one that is highly regarded by Emory, Agnes Scott, and the Carbon Offset team.

Atlanta is proud to serve as the residence and headquarters for the remarkable work of Habitat for Humanity. With such a prominent, local organization, Emory would be remiss not to pursue the opportunity to include Habitat for Humanity's work in the service work of the carbon offset program. Further, with Habitat for Humanity's primary mission for transformative community development, the carbon offset initiative at Emory fits naturally into the scope of their expertise. As is evident, Emory's carbon offset program prioritizes the co-benefits of community engagement, education potential and revitalization practice, the core values of Habitat for Humanity's efforts.[83] As such, the partnership between Emory and Habitat for Humanity works to identify Atlanta communities with the heaviest energy burden (the percentage of a household's income allocated to electricity costs) and direct the weatherization efforts to support and alleviate this stressor. Humanitarian efforts fit nicely into the mission of weatherization, and thus the values of each project fit hand in hand.

Discussion

The rationale for the items presented above is relatively simple as the majority of these steps fit the basic requirements of carbon registries. The accounting procedures are set, but the

[83] "Atlanta Habitat for Humanity – Build. Thrive. Grow." As per the Habitat for Humanity mission statement, "Atlanta Habitat for Humanity transforms communities by acting as a catalyst for neighborhood revitalization through education, innovative development, partnerships, and long-term relationships with families"

invested parties and established partnerships for the program are subject to change. Thus, while I do not justify my proposal here, I instead offer a note on the nature of offset partnerships. My discussion here is tailored to the Offset Team. The proposed partnerships are prioritized; Habitat for Humanity, Southface Institute and Trees Atlanta are all entities that parallel Emory's mission in practice and intention but do not necessarily have the immediate resources (time, planning, personnel, etc.) necessary to contribute to offset projects in the timeline established by Emory. These organizations are preferred by Emory for the ties that exist between the University and the respective groups, but it is understood that the connection does not require collaboration.

The partnership with Agnes Scott is established. Throughout the planning process both Universities have been extensively involved in creating the basic foundation for the initiative's inception and thus this relationship is solid. This extends across selected projects and protocols (if alternatives to the weatherization project are pursued by the Emory administration) and thus the relationships can remain flexible. Key components here exist in that the peer-review committee is concrete. While the players assisting in the actual projects may change (and are expected to as Emory expands the portfolio of its Carbon Offset Program) the partnership between Agnes Scott and Emory for peer-review will remain throughout.

Together, the work of the Carbon Offsets Working Group, the Office of Sustainability Initiatives, the Emory Administration and the members of Agnes Scott College has built extensively upon itself. The collaboration has been fruitful and, although a timelier endeavor than originally expected, the Working Group is excited by the prospect of the program's success.[84] With the proposal I provide, the offset program for Emory will strengthen ties with the

[84] In the original timeline, we hoped to have an operational offset program collecting funds and initiating the actual projects. While the current trajectory is still progressing, the numerous required steps for development have been slower than initially expected. This is discussed in the Concluding Remarks section.

Atlanta community, promote the goals of the One Emory Initiative, and fortify the intercollegiate cooperation for the betterment of the world. In concluding my work on this project, I feel tremendously fortunate to collaborate with the passionate, sincere work of all members involved, and wait in great anticipation for the Program's potential to propel Emory further into the realm of the most advanced, renowned, and progressively activated universities in the United States.

Concluding Remarks

The development of a carbon offset program is a timely endeavor. The work conducted by the Emory University administration, the Carbon Offsets Working Group, and myself in my position within the Emory Office of Sustainability Initiatives took place in the months leading up to the 2018/19 academic year and continued heretofore. My personal work for the Carbon Offsets Initiative as well as my research included in this paper is concluded at the time of graduation, and thus the work presented here is the most current information at the time of drafting this piece. For the sake of organization, revision timelines, and transparency in my writing I have concluded my work as of the 20th of February; the date of my completion of a briefing document submitted to the Emory University leadership proposing the Carbon Offset Program. All progress of the Program development occurring after this date will be recorded in the data of the University but is not discussed or presented here. While February 20, is well before the submission deadline for the piece, it is the date selected to allow for sufficient editing and rewriting while maintaining thorough record.

The timeline for completion and inception of the Carbon Offsets Program does not entirely align with the academic calendar or the deadlines of my submission to Emory's Honors Program, and so the full timeline recorded here is not necessarily an exact match to the

development of the Program that may have occurred post-submission. For the sake of continuity in my writing, I have maintained a tone throughout this piece as if each of my proposed avenues of development were accepted and followed by the University. It should be noted and recorded, however, that the scholarship of this piece serves to substantiate the recommendations I have made throughout my time with the Carbon Offsets Working Group but may not illustrate the decisions made by the University Administration after submission of my work. As such, I present this piece as a document with varied utility–The previous pages exist as a record of the work that was completed by the Working Group from June 2018 until March 2019; they consist of my proposals (and justification for these assertions) given the goals of Emory University, the conditions of Atlanta, and my research into the integrated disciplines framing my degree. Finally, they outline the perceived functionality of the Program if my recommendations are adopted.

Together, I depict a comprehensive array of the components required for initiating a carbon offset program in an institutional setting. I discuss the climatic concerns that may prompt a university, business, or organization to pursue offset strategies and the decisions and challenges they may face in doing so. My work has taken the cross-disciplinary vantage points of environmental science, economics, sociology and psychology, with supplemental discussions from political science and institutional policy implementation. Only through the integration of these fields can a robust proposal be drafted. Thus, the interdisciplinary nature of this project is clearly evidenced.

At the time of concluding my work, the Carbon Offset Program sits waiting approval from the Emory Administration. With full endorsement, the Program will be initiated, taking the finalized name of the Emory Carbon Offset Initiative, or ECO Initiative for short. The steps outlined above were completed, reviewed, and compiled into the briefing document discussed in

Section 2.1, *Selecting an Offset Type*. This document will be submitted to the University Deans and reviewed for approval. Adjustments made to the briefing document, or the plan it blueprints, will be returned after the submission of my work and thus the realized nature of the ECO Initiative may differ slightly from the proposal I have provided.

While the Initiative may have different nuances than the recommendations I present, the global effect of the ECO Initiative remains intact. The earth, and the surrounding atmosphere, is nearing a brink; with the rates of emissions continuing at the current level, and the climatic trends that are subsequently realized, the future of our planet is becoming ever more volatile. Drastic action must be taken to mitigate the anthropogenic effects our societies are inflicting on Earth and her systems, and those with the capacity to instigate change should feel compelled to do so. Emory University strives to take responsibility for the footprint it leaves, and so too do I encourage institutions around the globe to follow suit. For a sustainable world, a healthy home, and the wellbeing of each and every community on the planet, the time for action is now.

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