ANALYSIS OF MOTIVATION, METHODOLOGY, AND POTENTIAL IN CAMPUS CARBON EMISSIONS MEASUREMENT AND MITIGATION PLANNING

By

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To friends and family all

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LIST OF ABBREVIATIONS

AACUP	American Association of College and University Presidents
CC	Climate Commitment
CCX	Chicago Climate Exchange
CSAF	Campus Sustainability Assessment Framework
LEED	Leadership in Energy Efficient Design
MTCO2E	Metric tones of carbon dioxide equivalent normalized unit used to quantify emissions.
PCOC	Purchased Carbon Offset Credit

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This work examines the carbon mitigation planning efforts being conducted as part of the American Association of College and University Presidents' Climate Commitment program. Under the program signatories commit to eliminate carbon emissions from campus operations by a set future date. The source of data for the study are the plans created by participating institutions and include a standard set of data regarding sources of emissions, enrollment, and other structural factors.

This study approaches the examination of the plans from the perspective of wanting to discern influential factors of the institutions in their resulting plans. The participating institutions are divided into four strata by factors of ownership, majority of degrees awarded, and enrollment. In examining the planned methods of mitigation the study has focused on the use of purchased carbon offset credits and how that relates to the aforementioned structural factors.

In addition to the structural examination and study of the use of offset credits, this research has utilized a content analysis methodology to examine the use of certain types of language and to look for the expression of ethical or motivational language in

the plans. The findings of the content analysis are then related to the structural factors of the signatory institutions in an effort to find relationships between the type of institutions and the narrative content it creates. The narrative speech of an institution reflects its understanding of its relationship with the environment and its participation in the Climate Commitment Program.

CHAPTER 1
INTRODUCTION

Background of the Study

College campuses have been at the forefront of sustainable development in examining their resource use and creating innovative strategies to limit their environmental impact. The unique situation of campuses with their constant construction, renovation, large populations, available resources, and a progressive approach to facilities management make them a useful study in sustainable development. The intent of this study is to examine a wide range of college carbon emissions reduction plans in an effort to learn the prime motivations and methods for these efforts. This research has utilized the planning undertaken under the Climate Commitment program of the American Associational of College and University Presidents.

The primary source of carbon emissions identified in these planning efforts is campus buildings including construction, maintenance, and operation. Between the declared motivations and intents of the college and university organizations and their proposed efforts to limit or control carbon emissions is some understanding of the relationship between the buildings and their occupants' needs from the built environment. This research will consider that understanding in an ethical context in an effort to better understand the planning choices made.

The construction, use, and maintenance of buildings are the focus of all the planning efforts studied. Building are the largest proxies for the production of greenhouse gases, in order to reduce carbon emissions to the level proposed in the plans, buildings will have to be the primary area in which reduction efforts are

implemented. Buildings are the physical body of the campus and their metabolizing of resources is directly under the control of the college or university itself. Lastly buildings represent much of the tradition and stature of the university whether through their history, architecture, or their social significance as the places where students live, professors work, and research is conducted, they are the showcase of the university as well as the body and therefore deserve and receive a great deal of attention. Capital projects, such as major renovations or new building construction have been a part of the boom in university growth and a sign of prosperity and prestige for the university and the administration which succeeds in providing these big projects. The modern campus is defined not just by its historic structures and spaces but also by the near constant construction taking place on virtually every campus. This rate of building and locus of sustainability problems in buildings has resulted in their being the primary component in any kind of sustainability planning including the carbon emissions planning studied here.

In addition to institutional motivations there also exist ethical imperatives that are driving the efforts to eliminate carbon emissions from campuses. Universities have been some of the first institutions to recognize their responsibility, even outside of business case or legislative command, to reduce carbon emissions and to accomplish that by beginning to think differently about buildings. An ethical approach to buildings goes beyond the essential and traditional trinity of ‘labor, materials, and time’ and adds a moral component to what is done to erect a structure for human use. This research will examine the nature of ethical motivation and expression in the plans by conducting a content analysis of the language of explanation or justification in the plans.

Climate change has been recognized and is slowly being accepted as the great challenge of our time. The anthropogenic causes of warming trends has at its root the wide scale burning of fossil fuels and the associated emitted gases, which then linger in the atmosphere and prevent radiated energy from escaping back into space by acting as an insulator of sorts. The sources of these emissions are associated with all aspects of modernity and it could be argued that the driver of modernity has been this availability of nearly limitless, costless, high-density energy. Modern society has become a sort of machine whose function is to free sequestered carbon from subterranean sources, stored there over epochs by the natural processes of life and geology. As those processes played out they fundamentally altered the composition of the planet's atmosphere and climate. The machine of the modern has reversed this process and proceeded to free and reintroduce that carbon back into the atmosphere and start the process of returning its composition and climate to an antediluvian state. Those uses of energy, worldwide and essentially the same in the United States, breakdown into thirds: transportation, industry, and buildings.

Transportation receives a great deal of attention. Transportation is something everyone deals with everyday; it is in front of us, around us, it literally drives our lives. We know exactly how much it costs us personally in purchase and fuel. Transportation is part of the cultural make-up of the United States, our so-called 'car-culture.' The personal choices we make with our transportation whether it be a personal automobile, public transit, first class or coach flying, or any number of others helps define who we are in a consumer culture. The choice to drive a large truck or a small car is almost entirely driven by personal expression rather than utility. Part of the popularity of

transportation as nexus of emissions concerns is almost certainly because it is reduced to a single number, the much vaulted miles-per-gallon. A single number is easy, it makes direct comparison easy, and it is intuitive. Seemingly similar means of comparison such as energy used per square foot are only useful with qualifying conditions of the building such as location, use, occupancy, or other specialized factors. The problem for those of us concerned with emissions reduction from the perspective of climate change is those personal choices are driven not by technology or need but by fashion and personality. The efficiency of moving a particular mass a particular distance is very easy to describe mathematically and has real physical barriers to the degree to which high levels of efficiency may be achieved. In other words, the problem of transportation efficiency from a technical standpoint is easy to understand but difficult to implement. The equally large problem of energy use in buildings is much more difficult to quantify, conceptualize, and manage.

The scale of the built environment and its associated emissions operates from the small end, a single apartment for instance, to the global scale. Part of the question of building sustainability, particularly with regards to emissions, is which scale is most appropriate to effect substantive reductions in emissions. The individual can turn off their lights, unplug their appliances, and shut off the HVAC system. This substantively effects the emissions associated with that personal space, but the net effect is negligible. Doing something similar on a global scale would have impact but impossible to implement. Those of us examining this problem of emissions in the built environment must try and find the scale at which we can effect maximum mitigation but still manage and implement the changes required. Architects may address this problem on the single

building scale using systems such as the Leadership in Energy Efficiency Design program (LEED), nations may address the problem from mandating building codes and efficiency standards, and in between those extremes communities and institutions may undergo planning and implementation of programs addressing the net emissions of operations not just from the operation of buildings but incorporating transportation and industrial activities.

At the forefront of these community and institutional scales are colleges and universities. Playing their traditional role of providing innovation and long-term thinking to solve pressing problems, colleges and universities have begun to address carbon emissions from their own operations, essentially using the campus as a whole as laboratory for emissions mitigation incorporating scales from individual classrooms to hundreds of acres serving tens of thousands of people.

This research occurs at a time when the first steps are being taken to thoroughly measure, document, and plan for the reduction of carbon emissions at a wide scale and in a vertically integrated context. As these specific plans and as societal efforts over the coming generation succeed and fail in their efforts to reduce emissions it will be important to have studies such as this one that exist in a historical context and that have helped to inform the process along the way.

Scope of the Project

The American College and University President's Climate Commitment (http://www.presidentsclimatecommitment.org/) represents over 600 colleges and universities and has created a set of guidelines and formats for creating comparable carbon mitigation plans as well as a reporting system to keep track of the progress being made in implementing the plans. The data sources for the study are the plans and

the reporting system implemented by the Climate Commitment program. The goal of this study is to both compare the goals and methods of the plans but also to try and understand the intent and motivation of the respective colleges and universities in creating these plans. The study looks for demonstrable relationships between the emissions of institutions, their use of particular mitigation strategies, and their narrative explanations of their participation and efforts.

Research Questions

Carbon emissions and mitigation plans:

- How do essential factors of the participating institutions effect their emissions?
- How do those factors affect the use of particular emissions mitigation strategies?
- What role do carbon offset credit purchases play in the mitigation plans of differing types of institution?

Narrative content analysis:

- Is there a relationship between the institutions expressed motivations and the type of institution?
- How often is hedging language used?
- How often is imperative language used?
- Is there an explicit ethical view described?
- Is there an explicit source of motivation described?
- Do certain types of institutions create certain types of plans? What condition of the institution seems to influence the planned efforts?

There is a confluence of planning for sustainability as well as carbon emissions reductions and resource management in much of the program material. This project will

puzzle out which of these competing motivations and goals are best addressed by the plans.

Sustainability thinking and institutional motivations have worked together in creating these plans but what ethical frameworks were parts of that motivation? Even ambiguous or ambivalent statements of motive or goals can give way to clear underlying attitudes and thinking about environmental issues and those attitudes and premises.

From an environmental point of view the most important factor in these plans will be carbon emissions measurement, control, and reduction. How each school handles the questions of carbon emissions will form the bulk of the research. All the participating plans tended to propose similar mitigation strategies:

- Efficiency: replacing older equipment with newer, using efficiency as a higher priority in purchasing decisions, and generally ‘tuning’ thing up.
- Behavioral changes: encouraging changing patterns of transportation, encouraging the turning off of things, and providing incentives for reduced emissions producing behavior.
- Changes in infrastructure: broad changes in the source of energy used in operations, often employing alternative energy, on-campus energy production, or exerting influence on energy providers to change their sources.
- Purchasing offsets: nearly always addressed in planning and often utilized. Purchasing offsets plays an essential role in addressing emissions that are either difficult or impossible to mitigate through institutional actions.

The research and analysis consists of two distinct parts. The first is an analysis of the reported data for each participating institution. The analysis consists of certain data that is available for all or nearly all institutions and is meant to develop a complete picture of the program and its participants. The analysis in this section provides insights into how structural factors of the institutions (ownership, size, and types of degrees

awarded) relate to their emissions, planned future emissions, and use of purchased offset credits. The second part utilizes a representative sample to conduct a content analysis of the plans to find relationships between certain types of language used and the structural factors as well as their emissions mitigation strategies to find relationships between the use of certain language and structural factors.

CHAPTER 2
LITERATURE REVIEW

The primary documents for this study consist of the campus sustainability plans themselves and their supporting documentation. The program's guidelines require that the institutions conduct a long-term planning effort and submit their completed plans to the program tracking system. Participation in the program requires regular plan updates and reporting of emissions levels. The program requires institutions to implement two of seven emissions reducing measures described in the commitment text.

The literature and available materials on sustainability topics is vast and quickly growing. This project looks narrowly at the institutional data reported as part of the Climate Commitment and the motivation and ethical basis for these planning efforts. The scope of the literature review will be limited to published works specifically on campus sustainability planning and similar community sustainability planning in contexts similar to campuses; central control, small populations, progressive action, and the financial infrastructure available to implement planned actions. A review of the literature of content methodology in the narrow context of planning is included.

There is extensive literature available on the motivations for carbon neutrality. Virtually any text on modern ethics, environmental ethics, environmental policy, or sustainability will discuss the obligation to reduce carbon emissions, an obligation taken up by individuals and organizations despite a lack of leadership at the national level. By becoming signatories to the President's Climate Commitment, the colleges and universities in this study have demonstrated their imperative to take action on the issue of carbon emissions. Their specific arguments and motivations for this represent the content analysis part of the study and the results are discussed in that chapter.

General University Sustainability

Michael M'Gonigle and Justine Starke in 'Planet U' try to understand campus sustainability in a holistic manner before dividing it into particular actions. Their concept is that only a post-modern constructivism will allow the university to reground itself in 'reconstruction' rather than 'deconstruction.' They argue the university as institution must find a new set of roots not in the abstract world of knowledge, driven by corporate and government money, but in the core of the university itself, in its home, the campus. (M'Gonigle & Starke, 2006) (p41)

M'Gongile and Starke continue to try and put the university into a societal context in order to understand how it might approach a sustainable transition. It becomes clear with little research that the university in a modern context is not so much a physical place of learning anymore than it is a cloister of transcribing monks; both archaic manifestations of the university. The university has become the corporate and government research department, more focused on grants and donations than on learning, the accumulation of knowledge, and teaching. Research outside of a critical context is not worthy of the mission of the university and has lead to a situation in which the essential future of not only the university but of society itself is being called into question. If a university cannot sustain itself then how can society as a whole be expected to?

The hubris of the university is the source for the shortsightedness of our society, the university needs to take up its traditional role of leader and innovator, not in commerce but in the larger realm of humanity.

In discussing transportation as a source for emissions and central to the sustainability of urban and suburban universities M'Gonigle describes a dialectic

between a 'territorialist' system and a centrist system of community development and hence transportation. (p83) The university is at the heart of this tension because of its reliance on transport and its position as hub of sorts in any particular community. The transition of transportation from individual mandate in the form of personal cars to a system of community transport, making better use of resources both material and social, and human powered bicycles, M'Gonigle and Starke argue, is an essential step in creating a sustainable university. The argument is for reshaping community through 'smart growth', with the implication that by 'smart growth' we really mean a filling in of blanks within the social system rather than growing its boundaries, to provide the social and university situation in which efficient transportation can exist by creating efficient communities.

This approach to understanding the problem of sustainability in the context of universities represents an understanding of the solution not being more of the same with greater efficiencies, but of a fundamental shift in the built environment's metabolism of resources. M'Gonigle describes the essential truth that the orders of magnitude improvement in energy use (and potentially renewable energy) is required rather than the slight of hand improvements of so-called 'hybrid' cars, which are still entirely powered by fossil fuels. Any change toward sustainability that is not a fundamental and dramatic change to existing systems is not sufficient to achieve sustainability.

While acknowledging that most universities exist outside of city centers, M'Gonigle does not adequately address the transit needs of rural and suburban universities, that is to say his arguments are all predicated on the existence of a dense urban center or otherwise compact development that lends itself to mass transit or human powered

transit of various types. The problem of emissions and infrastructure support in smaller and less dense universities is left unresolved. This approach covers many of the institutions around the world but the development of the university system in the United States created a situation in which many institutions are located outside of urban centers.

M'Gonigle provides an essential observation that transformative policies require a transformed decision making process to create an environment in which those transformations can take place. (p103) In general M'Gonigle touts the planner-new-urbanism-party-line about dense multiuse development. The important boundary between university and town seem to be being blurred in his vision, even so far as including in future university buildings “mixed-use development with retail and other services at the street level and housing, offices and classrooms in the upper levels.” (p103)

This suggestion of further integration of commercial use, even small scale, in the university strikes me as an assault on the essentially separate character of the university from other urban development. New-urbanism's approach to development, with its emphasis on integration of housing, commerce, and other services, would only serve to homogenize the urban landscape and further blur the important social and physical boundaries between different human institutions. Should churches also have coffee shops on their first floors with loft apartments above? The vertical stratification of the urban landscape may serve certain planning purposes but it does not directly address the problem of sustainability in universities. M'Gonigle and Starke do not

directly address how the application of urbanist principles to the setting of higher education furthers the goals of either.

What little is made available addressing 'green building' in “Planet U” is largely press release material without using any critical tools to examine claims or even to contextualize percent reduction goals. Claims to plan to reduce emissions of certain percentages leave out several important facts: whether those goals are met, the total that those percentages are reductions from, whether those reductions are meaningful in a larger growth system, and how those reductions are achieved whether by shifting the emissions to other sites or by reducing the metabolism of the site in question.

M'Gonigle and Starke come to the sustainability discussion interested in aspects of urban community, planning, and particularly social sustainability. Environmental sustainability seems to be seen as a subset of social sustainability. The emphasis is on local action and changing power structures as part of the hierarchical system.

In “Degrees That Matter: Climate Change and the University” Ann Rappaport and Sarah Hammond Creighton discusses the differences between systemic and incremental changes in emissions and focuses the text on incremental changes as being more readily achievable by most institutions. If those incremental changes aren't going to solve the problem then why attempt them? (Rappaport & Hammond, 2007) (p48)

Rappaport and Creighton devote a significant portion of the book to discussing the power structures and decision-making processes used at many institutions and how they will influence sustainability planning and projects on the campus.

Rappaport and Creighton deliver a complete analysis of climate change mitigation strategy, history, players, and implementation in a university context. M'Gonigle is focused more on the social aspects of sustainability and the universities connection to the local community. Rappaport directly addresses the problems of this research but the planning and social aspects discussed in M'Gonigle are also important in designing a plan that goes beyond simple commitments and idealism and toward functionality and long term viability in the social setting of the university.

Growth Planning in a Sustainable Context

In a very general sense this study examines subjects generally covered under the guide of ‘growth.’ There is an expectation that institutions, like most aspects of society and economy, plan to grow larger over time. This condition is being challenged by a seemingly contradictory demand that institutions also reduce their negative environmental, economic, and social impacts; that they should grow in a “sustainable” way. This new imperative has created a broad new field of planning and inquiry of which this study is part. Recognizing the importance of the impact of carbon emissions on the prospect of sustainability has resulted in many planners rethinking how to contextualize their plans in a carbon-limited policy environment. (White, Jonas, & Gibbs, 2010) In addition to the top-down approach of centralized planning there is a simultaneous bottom-up grass roots approach occurring that is emphasizing the same goals of reducing or eliminating carbon emissions but also providing for social and economic sustainability. (Seyfang, 2009) As these two approaches begin to meet in the middle the conflicts that arise are often those of values, of which aspects of sustainability are most important to the grass roots individuals and their civic organizations and to the larger planning scale and their goals for sustainable communities. (Seyfang, 2006)

Mary M. Edwards and Anna Haines in “Evaluating Smart Growth” examined the implementation of Wisconsin’s smart growth initiatives and its effects on the communities. The study's data was composed of the community planning efforts and the methodology included an evaluation protocol similar to the method proposed for this study.

The literature on planning for growth and sustainability includes a number of similar studies both at the plan development stage (Berke & Conroy, 2000), and through the post-planning evaluation of results stage. (Talen, 1996)

Perhaps most interesting in relation to this study are developments in sustainable development in China. China has similar characteristics as this study’s population: a central and powerful power structure that can implement wide-ranging and large scale changes to operations, a progressive population that is forward thinking on the topics of sustainability, and the resources to implement a wide range of activities to achieve their goals. The main difference between the Chinese efforts and those of this study’s population is that is goal, in which the Chinese often lack specificity, and in scale where the Chinese are operating at a scale that is orders of magnitude larger than the Colleges and Universities studied in this research. (Lehmann, 2012) Interestingly the same grass roots activities that are driving sustainability initiatives in the west (often focused on food and housing issues) are encountering the same planning activities for sustainability in China (often focused on carbon emissions.) (Zhu & Lin, 2004) (Zhang & Ye, 2010) The findings of Zhu and Lin in China and the findings of Seyfang studying populations in the US paint a different picture of greater cooperation in the Chinese group and a seeming retrenchment of the two camps in the American case.

Scales of Carbon Mitigation Efforts

The scale of sustainability efforts varies greatly and determining the best scale of action for particular problems in sustainability is an important part of developing sustainable societies. The action we take as individuals toward sustainability have small effects but are straightforward to design and implement. Actions taken at the other extreme of the global scale would have a very high level of impact, but implementation would also present global scale challenges.

At the individual and family scale there are many ways to address emissions resulting from activities. Reducing domestic energy use and increasing the efficiency of transportation are straightforward and easily implemented techniques to reduce emissions. The problem in emissions mitigation planning at the individual scale is how to alter the behavior of individuals in order to mitigate emissions. (Heiskanen, Johnson, Robinson, Vadovics, & Saastamoinen, 2010) Heiskanen et al argue that traditional means of motivating individuals to alter behavior, such as education and financial incentives, are not consistently successful because of more difficult to address factors that result from the individual's social context. (Guy, 2006) Because of the social context of all individuals and its influence on their carbon emitting associated behavior the individual scale is less effective than a larger scale that focuses on larger groups of people. The likelihood of individuals to make carbon mitigating changes in their own behavior is positively correlated to their expectation and endorsement of larger scale mitigation efforts. (Akter & Bennett, 2011)

City scale carbon mitigation efforts have been a focus of research in mitigation methods and have shown efficiencies and possibilities not possible for individuals, and that would not be applicable in a larger geospatial context. (Davies, Edmondson,

Heinemeyer, Leake, & Gaston, 2011) Similar scaled but intra-organizational communities have attempted to integrate institutional and municipal efforts at carbon mitigation. This integrated approach is more complicated and still in the framework building stage mirroring the planning efforts of the Climate Commitment. (Ramaswami A. , et al., 2011) In studying mitigation planning done by the city of Denver Colorado Ramaswami et al were able to develop a framework for understanding the different actors from individuals acting for themselves, designers and managers implementing mitigation efforts, and those in the policy realm. The results of that study demonstrated the low rates of emissions mitigation possible through individual behavioral change efforts and the importance of larger scale efforts. (Ramaswami, et al., 2012)

At the scale of nations, carbon mitigation takes on a much wider range of options and challenges. Political considerations are more pronounced and influential and the actors involved shift from the individuals that are the actors in mitigation strategies in the smaller scale to nations and whole institutions that make up the functioning parts of the national scale. (Hertwich & Peters, 2009) At this time the most compelling and complete research in national scale carbon mitigation efforts is coming from China. Similar to the institutions making up the subject of this research, China has a centralized political and economic control hierarchy that is capable of national change quickly and more radically than western democracies. (Li & Colombierb, 2009)

Chinese models of carbon mitigation have provided a sound groundwork for future evaluation of mitigation successes by examining the problem from a perspective of large point source emissions and from an evaluation of the emissions associated with individual citizens. In the first case, Zang et al model and describe the current state of

China's reliance on coal and other emitting sources of energy. This modeling is similar to the baseline emissions measurement methods employed in the Carbon Commitment plans. (Zhanga, Ma, Liu, Zhangb, & Li, 2012) Modeling of this sort, in combination with institutional modeling, begins to construct a framework for a complete vertical integration of emission from source to use. A similar set of frameworks available in a single national context would be essential to a comprehensive carbon model at the national level.

The second case of modeling being conducted in China and other nations from the individual level to trace the distribution of the results of emitting activities leads into the international scale of carbon mitigation. Chakravarty et al have constructed a model of individual distribution of carbon emissions from the national scale to the citizen scale and removing other scales in between, arguing that equitable distribution of resources and any sort of cap and limit efforts would be most successful when considering the unit of emissions to be the citizen described only by their nationality. Chakravarty et al have also provided in their model of national and individual emissions considerations such as business as usual emissions if no mitigation efforts are undertaken and placed a limit on the low end of emissions. This model has demonstrated that by limiting the low-end of emissions allows for equitable distribution without the need for substantial reductions in the resources used in the fight against extreme poverty. This pioneering research has provided a context for national emissions mitigation predicated on the baseline and business as usual emissions allowable under an equitable distribution system of emissions allowance. (Chakravarty, Chikkatur, de Coninck, Pacala, Socolow, & Tavoni, 2009)

These modeling efforts have provided essential context at the international level of mitigation planning. Calvin, Fawcett, and Kejun have begun the task of taking the emissions models of Asian nations and evaluating the ability of those nations mitigation planning efforts to achieve their stated goals. The diversity of plans and the influence upon those plans by international carbon mitigation agreements is an essential step in understanding how planning takes place. The use of regional comparative evaluations provides the beginning of a narrative of mitigation that will continue as plans are implemented. (Calvin, Fawcett, & Kejun, 2012)

Because climate change is a worldwide problem involving absolute levels of atmospheric greenhouse gases the construct of scales and the entities that comprise them is not limited by geopolitical boundaries, economic situations, or other traditional factors. Chen and Chen's research into the supra-national scale of emissions assembles cohorts of nations according to emissions levels and levels of economic development. (Chen & Chen, 2011) This freedom to find otherwise unassociated scales of emissions is an instructive model and mirrors the distribution of institutions into strata based on structural factors that this research utilizes.

Effectiveness of Carbon Mitigation Strategies

Most of the plans and indeed most planning guides and guidelines pay most attention to the construction of new facilities. It should be clear that new construction will represent more emissions than existing buildings whose initial emissions are already being amortized over the useful life of the building, a time span often measured in centuries. It should be a maxim in green building that the greenest building is the one already built.

A similar case to the situation of many universities trying to justify continued new building projects with “green” labels and certifications has occurred in Britain where so called “Eco-towns” have been proposed but have experienced a great deal of resistance from the public and from attentive government representatives who have noted many problems with the proposed developments but the most essential criticism being that the new developments don't account for the carbon emissions from their construction or from their daily operation beyond basic services. In addition, their location in less than central localities could imply future emissions from travel. These critics contend that retrofitting existing housing would be far more “green” than building whole new developments, which is virtually the opposite of any serious green thinking about buildings. (Hibbert, 2009)

Carbon mitigation is a difficult problem and many nearly standard approaches have failed to deliver the straightforward gains in energy efficiency promised. In particular, the popular LEED certification programs have failed to demonstrate actual increases in energy efficiency compared to similar buildings without LEED certification. John Scofield at Oberlin College has conducted research examining the methodology of LEED's claims to energy efficiency and found compared to EPA methods the LEED approach will distort the actual emissions occurring from the energy used by the buildings in questions. (Scofield, 2009) The Adam Joseph Lewis Center at Oberlin College in Oberlin, Ohio, near Cleveland is rightly hailed as a major breakthrough in the experiment of integrated and ecological design of buildings. For all its integration and technology the argument put forth by Scofield is that it has essentially lost sight of the point. While certainly impressive and important, the integration of all these functions into

a single building, rather than treating a collection of buildings as a group and serving their needs with local but central services is probably more in keeping in the appropriate scale of services from an ecological standpoint. The scale of a campus is an excellent scale from which to offer various services and operate them in an ecological manner. The living machine artificial wetland of the Lewis center is an amazing achievement but is each new building to support its own wetland? Wouldn't it make more ecological sense to design campuses with integrated or utilized wetlands for groups of buildings or the entire campus? The project has been widely written about but the problem of scale has not been directly addressed. (Orr, 2004)

Scofield's analysis uses the idea of measuring emissions from the power generation source, which is the end game for efficiency after all. Using energy efficiency of a building against a base line is only a proxy for the real goal of emissions reductions. This type of analysis could be considered as expressing the principle of Goodhart's Law, a maxim in economics that states once an indicator is utilized a surrogate indicator for another measurement for the purpose of, in Goodhart's case, influencing economic policy, in our case, influencing building efficiency measurements in respect to greenhouse gas emissions, that surrogate factor will be gamed by the system it was meant to measure until it is effectively useless as a proxy measure for the thing meant to be tracked. (Goodhart, 1975) The implication for our purposes in criticizing LEED as a measure of greenhouse emissions is that it has become adapt to optimizing its own measurement system for building efficiency without actually introducing measures and techniques to the buildings themselves that reduce greenhouse gas emissions. That is

essentially Scofield's point in his analysis of Oberlin College's performance in reducing greenhouse gas emissions.

LEED and similar programs have been successful in implementing a range of improvements to the built environment. In the sub-set of efforts aimed at carbon emissions mitigation these efforts have been successful in broadening consciousness of the problem and in promoting new and innovative approaches to reducing emissions. The improvements in efficiency though have not addressed the real problem of *total* emissions, the only relevant measurement in regards to environmental problems. A unique property of the Climate Commitment is its goal of complete elimination of emissions rather than some arbitrary reduction in the increase in emissions as is often the effect of other programs.

College and University Systems to Evaluating 'Green' Performance

There are numerous systems developed for evaluating the green performance of colleges and universities. Some of these are prescriptive, offering more a vision and a set of evaluation and planning tools, other offer more in the way of evaluating actual performance of implemented measures. The following section will examine and put these programs and methodologies into the context of this research and the studied system.

In addition to the more general framework systems, many colleges and universities choose to design and implement their own ranking system. I can suggest several reasons for this. This may be because each campus is unique, having different climates, different scales, different needs, and different levels of support both politically and financially for such projects. There is also a component of competition amongst institutions; none want to be beholden to another institution for their building design or

rating so they develop their own, often heavily based on existing frameworks. Universities have great support for such projects and have a lot of available participation for developing their own plans. It is far cheaper and easier to develop frameworks, suggest research projects or otherwise study the problem rather than take action to change the way the campus operates. It is not difficult to convince students or faculty that more research is required and given the opportunity to try and solve such problems completely before acting, a university population is more apt to put off action and pursue planning.

The situation of colleges and universities presents a dichotomy of being both institutions like many others and being fundamentally academic in nature and purpose. The confluence of the ability to study and innovate with the ability to implement and refine, ultimately contributing those experiences to society makes the study population so interesting. One of the defining characteristics of the population is who the driver of the efforts is, whether it is students, faculty, administration, facilities management, or higher up political figures.

The experience of Audrey Chang developing sustainable construction guidelines at Stanford University seem typical of many such experiences of students trying to engage faculty and administration in making commitments and changes to the normal operating procedures of campus construction. In addition to the usual reticence of administration to address the problem of sustainability there were conflicts with other student groups and a desire for the university to develop its own green-building guidelines rather than try and implement or build upon existing standards, particularly LEED. (Chang, 2004)

In attempts to standardize campus carbon emissions planning and other aspects of sustainability planning, several general planning frameworks have been developed. The National Wildlife Federation's 'Guide to Climate Action Planning: Campus Ecology' provides a set of studies and participation exercises for evaluating campus ecology but does not focus on carbon emissions specifically and the accounting needed to track their reduction. (National Wildlife Federation, 2010)

The Canadian 'Campus Sustainability Assessment Framework' (CSAF) is an evaluation program similar to the tracking system of the ACCUP's program associated with the Climate Commitment Planning. Lindsey Cole developed the program for use in evaluating the sustainability planning of Canadian Universities. This project was aimed at improving planning feedback and plan development rather than the feasibility of the plan as is the focus of this research. (Cole, 2003) Almut Beringer implemented the CSAF in his evaluation of Canadian university sustainability planning and implementation. He points out that the weak point in the CSAF is the lack of rigorous accounting of carbon emission and mitigation efforts. (Berlinger, 2006)

The work of Herremans and Allwright looked at comparing institutions globally and developed a system aimed more at direct comparisons. (Herremans & Allwright, 2000) Creating a broader set of tools or frameworks to compare institutions beyond the US and Canada becomes more difficult due to differing standards in emissions reporting, cultural ideas about sustainability, and the influence of emissions reduction efforts. (Wright, 2002) Studies of individual institutions abound and as each institution progresses in implementing their plans and reporting their results case studies will proliferate. (Thurston & Eckelman, 2011) Comparison studies of sustainability

measurement tools have provided substantial results such as the case with Michael Shriberg's research. (Shriberg, 2002) As many of the comparisons and evaluations of sustainability tools have been more broadly focused, rather than singling out carbon mitigation planning. Many of the studies are now nearly or more than a decade old there is an opportunity to revisit these methodologies and evaluate the predictive value of that research in light of ten years worth of results.

Institutional Carbon Emissions Mitigation Planning in Context

The reduction of carbon emissions from human activity is central to developing sustainable ways of living. As easy as that statement is to make, it has proven difficult to decide on how to make emission reductions. Even with substantial increases in efficiency in the use of energy, the world's growing population and growing levels of affluence have combined to create a steady increase in carbon emissions. (Cranston & Hammond, 2010) Indur Goklany argues that rising levels of affluence over history have always led to greater human wellbeing, but that same rise also contributed to a dip in environmental quality. While affluence first causes pollution and degradation, it also provides the means and desire to clean up and restore the environment. Rising levels of affluence in the West have demonstrated this but it remains to be seen if raising levels of affluence globally will affect the sort of planet-wide problem like greenhouse gas emissions in the same way it mitigated pollution in specific geographic locations. (Goklany, 2009)

Businesses have played a role in developing expectations of institutional responsibility beyond their traditional role of actors concerned purely with economic development. In the business world the term 'social responsibility' encompasses a range of social and environmental topics and has become a common factor in business

operations and planning. (Hendry & Vesilind, 2010) The use of ‘green’ and ‘sustainability’ in the role of social responsibility in business has consciously created situations in which profits and other traditional measures of business success have been reduced in order to implement these principles. (Reinhardt & Stavins, 2010) In other sources the opposite has been argued, that businesses pursue factors of social responsibility for underlying reasons such as reducing cost and risk; strengthening legitimacy and reputation; building competitive advantage; and creating win–win situations through synergistic value creation. The ongoing research focusing on businesses and their relationship to social responsibility efforts represents a period of attitude formation and a self-reflective effort within the business community in an attempt to understand their role in the social and environmental consequences of their activities. (Kurucz, Colbert, & Wheeler, 2008)

Carbon emissions mitigation planning in businesses has taken an ad hoc approach in the United States with institutions developing their own efforts for their own reasoning. This makes direct comparisons between businesses difficult. The same is true in institutions of higher education in general and specifically the participants in the Climate Commitment. Some findings have indicated similar influences in carbon mitigation planning in businesses to those used in institutions of higher education. Ownership, public or private, and institutional culture represented at levels of management and broad institutional attitudes have influence as well. (Carroll & Shabana, 2010) A further difference between corporate efforts and public efforts at carbon mitigation planning is the successful use of incentives to motivate employees to make suggestions or change behaviors to reduce emissions. (Aggarwal & Dow, 2011)

Municipalities are conducting mitigation-planning efforts similar to corporations and businesses. The use of case studies in examining planning at this level and in the public sphere has demonstrated a variety of approaches to carbon mitigation. (DuBose, 2000) The lack of standardized emissions accounting and an agreed upon goal has limited the ability to directly compare planning efforts and conduct the kind of analysis made possible by the consistency of planning and reporting provided by the Climate Commitment program.

Increasingly research is showing that the most active and ambitious planning is taking place at the local level rather than the national level. This research points to the issue of *scale* as the defining characteristic of significant planning efforts. (Ramaswami, et al., 2011) The scale of these municipal systems is similar to that of the institutions who are participating in the Climate Commitment.

Carbon Mitigation Planning in Institutions of Higher Education

Colleges and universities have begun to take an active role in shaping the response to climate change by making the effort to mitigate their own emissions from operations. The traditional role of institutions of education and research has been expanded to include this meta-responsibility in utilizing the campus to act as social and technological laboratory. (Irandoust, 2009) American colleges and universities have been at the forefront of sustainability efforts of all kinds and have developed a wide range of reporting and evaluating systems to track activities associated with all things ‘green’ or ‘sustainable.’ As many institutions have undertaken the exercise of developing their own systems of reporting, it has not been a straightforward task to directly compare institutions beyond limited case study comparisons. (Fonseca, Macdonald, Dandy, & Valenti, 2011) These efforts by institutions to develop frameworks

have been influenced by their respective institutional cultures as well as planning efforts at every scale up to the international. In particular the influence of international declarations on sustainability topics has been noted as prevalent in the planning process. (Wright, 2002)

The Climate Commitment program has served to focus a portion of sustainability planning on the problem of carbon emissions and it has provided a framework for direct comparison of efforts toward a specific goal. The Climate Commitment's combination of specific goals and a thorough but reasonable reporting system has contributed to a wide range of institutions participating. (White, 2009) This range of participants strengthens the system and provides for a rich and diverse set of comparable efforts. The plans submitted by participating institutions, for the most part, do adhere to the goals of the planning process. Many of the plans include a range of information that could be called 'general sustainability' or 'other green things' that do not have to do with carbon emissions mitigation. In many cases the plan documents are not on the topic of carbon mitigation planning, misunderstand the goals of the program, and are explicit in not expecting to meet the goal, or even misunderstand the type of institution the plan represents. Those are the exceptions; in general the planning efforts conducted under the Climate Commitment program do directly address their stated purpose and offer a roadmap for their respective institutions to follow in order to fulfill the Climate Commitment. The plans are all available online at the Climate Commitment reporting system web site. (http://rs.acupcc.org/)

The choice in this study was to focus on structural features of the population (ownership, size, majority type of degrees awarded) but other studies have examined

other dividing factors. Ned Fetcher has published work describing the same population group in terms of their location, institutional size, and type of institution by degrees (though he divided them by master's and baccalaureate institutions rather than majority 2-year and majority 4-year as we have in our study.) Fetcher's findings were that emissions scaled closely with building area but less closely with enrollment. Geographic factors played a role and were included with factors of source of energy. Fetcher's methodologies did not allow for disentangling type of energy used and climatic conditions and confounding factors such as energy used for cooling in warm climates being as significant as energy used for warming in cool ones. Those findings covered a population of 238 institutions and were a significant portion of the total population. While his methodologies differed from the ones utilized here, his findings and those of this study are compatible. (Fetcher, 2010)

Looking at the same Climate Commitment population but examining in more depth the emissions as rate by enrollment and by type of building area, Cynthia Klein-Banai and Thomas Theis found that factors such as the activities that take place in buildings and the total enrollment were significant in predicting the emissions of the study population. (Klein-Banai & Theis, 2011) The examination of emissions as a rate per enrollment or building area is perhaps the most common means of describing institutional emissions. This makes sense since the rate description is representing the efficiency of the institution's operations. However, the Climate Commitment is not a program focused on efficiency but on an absolute goal of zero emissions. For that reason this study has tried to remain focused on the absolute emissions of the

participating institutions rather than on other explanations and descriptions of emissions such as geography and enrollment.

Carbon Neutrality in Other Institutions

The fundamental goal of the plans studied in this project are reducing or even eliminating carbon emissions from campuses. The college or university is certainly a unique type of institution but not unique in the problems they face in reducing carbon emissions. The same problems are faced by businesses, towns, neighborhoods, tourist destinations, and other sorts of 'places.' The similar qualities between these groups include:

- Defined Places: there is a geographical area with known boundaries in which the entities' activities take place.
- Emissions are quantifiable: there exists some reasonable means by which to calculate emissions from the place.
- Organization: there is some sort of organization with power to make decisions on issues of services and energy within the place. In the case of colleges and universities this is the administration and its parts both up and down the chain of command, faculty, community, donors, and students. In the case of businesses or towns there is some sort of elected or owner leadership. Even in neighborhoods there are decisions made about services either by a municipality or by citizen organization and action.
- Motivation: for various reasons a desire and motivation exists to take on problems that are not being addressed at some other level either because they are too onerous at a smaller level such as individual homes or buildings, or because of lack of political will or consensus at a larger scale. A dedicated set of users, be they students, clients, customers, or residents seems to be a requirement for serious action.

The problem of scale in emissions reductions seems to be solving itself organically. The larger international and national scales lack the political will to address the problem in a serious way. The regional scale can muster the will but lacks the control and accounting to understand and address the problem. The scale of individuals

or individual buildings seems to make the problem too burdensome or difficult, the above example of the Lewis Building at Oberlin College not withstanding (perhaps the exception that proves the rule?) The scale of community, college, university, business, or eco-focused destination (such as those promoted under the banner of 'eco-tourism') seems to be the correct one for addressing this particular problem.

Expected Use of Purchased Carbon Offset Credits

The market for carbon offset credits is growing rapidly; it can be difficult to determine the rate of that growth since the 'market' for carbon offset credits includes the voluntary Chicago Climate Exchange (CCX), which operates more like a traditional commodities market, and various other systems associated with other markets or not as the case may be. We can say that the rate of growth in 2005-2006 was about 200% with subsequent years supporting that upward trend. (Hamilton, Sjardin, Marcello, & Xu, 2008) At this time the nascent carbon markets do not provide a level of consumer confidence in the value of their credits or the methods by which they are generated. The level of commitment to their use found in this research would seem to reinforce findings by Dhandra and Hartman that consumer literacy on the topic of carbon offset markets is still low. (Dhanda & Hartman, 2011)

As these markets expand they are beginning to define themselves in the mind of the consumer. Research published by Lovell *et al* in 2009 utilized a methodology of critical analysis and interviews to understand the narrative being created by these developing markets and the consumers who buy carbon offset credits. This research has similarly used critical analysis as well as other sources of data to determine the extent to which the subject institutions are planning to rely on purchased carbon offset credits (PCOCs). Lovell *et al* describe 'offset narratives' as motivational factors in the

decision to purchase carbon offsets. Because the buyer receives no goods and (regulatory or self-imposed mandate aside) has no need for the product the use of such narratives becomes pivotal in the purchasing decision. (Lovell, Bulkeley, & Liverman, 2009) In this research the motivation for purchasing credits is to fulfill the Climate Commitment, which is utilized as one among many proposed mitigation methods.

The use of offsets is described in the above-cited works from a market perspective and in the intended application of the purchased offsets. As part of a planning program many of the studied institutions have conducted their own analysis as part of their participation in the Climate Commitment. Duke University has published several reports generated by graduate students working in their Nicholas School of the Environment and Earth Sciences highlighting their expected use of offsets as well as research into how the University's holdings could lead to producing offsets. (Downing, Fulton, & Strauss, 2011) (Conrad & Hodgson, 2011) (Wangerman, Kaufmann, & Tang, 2011) The conclusion of the researchers at Duke was that there existed substantial potential in the Duke forest holdings for the production of carbon offsets to be used or sold but there remained a great deal of uncertainty related to the cost of development of those credits and risks associated with whatever regulatory and tax regime may ultimately regulate such markets.

Many of the Climate Commitment plans expressed reluctance to utilize offset credits as part of their mitigation plan. Research conducted in support of the Climate Commitment planning effort at George Mason University examined attitudes of the campus population and found a high degree of skepticism in the legitimacy of offsets and whether the purchase of offsets had the same effect of reducing local emissions

levels at the nominal rate of the credit purchased. (McCauley, Robertson, Krueger, & Gurkin, 2009) Similar objections were expressed in the development of guidelines for the carbon neutrality at the Victoria University School of Architecture and Design. (Ryu, 2010) In each case it was expressed that without some tangible locally visible effort the claimed reductions from purchased offset credits were somehow less meaningful than localized action. In environmental terms and in terms of the Climate Commitment, the source of carbon emissions mitigation is irrelevant, the point is to reduce emissions, but in human terms as expressed above and in the narrative of many of the plans, there is a preference for more visible and local action. This distrust is warranted by the current lack of regulated and institutional carbon markets in which the integrity of the credits could be evaluated. In other cases the use of offsets was implemented without reservation such as was reported in research describing the Climate Commitment planning process at Central Connecticut State University and at Colgate University. (Button, 2009) (Greenfield, Leslie, & Stimmel, 2010) Planning at Yale University has taken a middle ground in recognizing the psychological impact of a visible and local project designed to mitigate emissions but also describing purchased offset credits as viable and useful tools in reaching mitigation goals. (Raunch & Newman, 2009) Another common description in the plans of the use of offsets is to tie their use to a particular activity, usually air travel. Air travel is one of the few sources of emissions related to campus operations that the institution has little opportunity to mitigate through technology, behavior, or other means. In a short article, Kathleen Smythe describes alternatives to the use of offset credits in mitigating emissions from air travel by rethinking and rearranging the behaviors associated with air travel. She suggests

reducing the range of conference attendance and reducing the size of conferences in order to limit the number of travelers. (Smythe, 2010)

Content Analysis

Content analysis is a method of extracting information from a narrative text that through frequency, type, emphasis, or other facts can be used to examine and compare the text with similar texts, provide information on the writer, or be used to make comparisons with factors of the subject of the text. Content analysis can be used in a range of ways to examine and compare documents. Content analysis is used in many fields as a tool to examine planning efforts for a range of activities including carbon mitigation. (Freedman & Jaggi, 2009) (Klüver, 2009)

Content analysis allows for an additional means of seeing the reported data from a particular organization. The use of this method in this research has been to try to provide a description of the motivations and attitudes of the institutions producing carbon mitigation plans. Similar studies have been used as a check on the use of carbon mitigation planning in companies and provides a supporting set of research that has examined similar problems with similar tools. Particularly the work of Sue Hrasky, who used content analysis to describe and assess the strength of action proposed in companies' plans in Australia. The study is very similar to this one though Hrasky's research objectives were different. (Hrasky, 2011) Prendeville, *et al* utilized content analysis in conjunction with carbon foot printing and life cycle analysis in an effort to develop a broad based tool incorporating all those techniques and use Welsh businesses as a test case for the methodology. (Prendeville, O'Connor, & Palmer, 2011)

CHAPTER 3
METHODOLOGY

Objectives of the Study

Main Objectives

The main objectives of this study are to ascertain the degree of ethical motivation in university carbon mitigation planning and to ascertain differences between the four strata populations in regards to their use of purchased carbon-offset credits for reaching their goal of eliminating carbon emissions from operations. This study utilizes the carbon mitigation plans of the 680 or so colleges and universities participating in the American College and University President's Climate Commitment. Using a representative sample of this population we have considered the language of motivation and intent in the plans to try and understand the relationship the institution has to its carbon mitigation efforts; the 'why' and the world view expressed in the plans. Secondly, the research will consider the carbon emissions at the baseline year, in a business-as-usual case of continued growth in emissions to a set end date, and the proposed quantities of carbon-offset credits needed in addition to other measures to reach the goal of eliminating emissions entirely. The study examines how factors such as size of institution, region, ethics, and others affect the planning efforts and proposed mitigation strategies.

Sub-objectives

1. What methodology was followed in creating these plans?
2. What kind of institutional force has been put behind implementation and tracking of these plans?
3. What was the motivation for participating in the program? Was there a particular process used in some cases or others or was an individual or group responsible for the impetus to participate?

4. How does the institution view itself in this process of planning for sustainability?
5. Was there an educational motivation particular to institutions of higher learning?

Hypotheses

1. There will be a range of ethical and theoretical approaches used in addressing the problems identified in the plans.
2. There will be a relationship between how the institution views these problems of emissions and how they are addressed, represented by the proportion of mitigation that relies upon purchased carbon-offset credits rather than structural or institutional changes.
3. There will be a relationship between expected growth of emissions in a business-as-usual case and the portion of mitigation coming from purchased carbon-offset credits.
4. Emissions mitigation strategies will be insufficient to meet reduction goals; they will not be sufficiently broad, will not be sufficiently funded, not be supported, or not be feasible.

The hypothesis in this research project is that there will be a range of ethical and theoretical approaches used in addressing the goals of these plans. In some cases the motivation will be sustainable by nature, it will be focused on environmental quality issues that effect the populations of campuses; in some cases the motivation will be economic, seeking to take advantage of incentives, funding, and cost savings associated with reduced resource use; in some cases ethical responsibility of the university will lead to the motivation to reduce carbon emissions; there are myriad reasons for supporting the plans with a range of sustainability, environmental, and economic goals.

Buildings are the largest source of emissions from university operations and are the source most easily controlled by the institution (compared with commuting, municipal resource use, or travel.) The campus built environment is the focus of most of the studies and recommendations. While the institutions utilize differing methods of accounting for emissions, they are roughly similar in what is included and the reported emissions are broadly consistent across similar institutions, allowing for direct comparison with little error introduced in the reporting methodology. For the purposes of this study, the reported emissions are the subject rather than a critical accounting of the carbon emissions measurement process.

Through understanding the motivations, theoretical underpinnings and interpretation of sustainability, and by evaluating the emission levels and mitigation strategies this study will create its own framework for mitigation plan comparison as the implementation periods increase and the dividends from implementation are realized. The entire population of institutions is used in the first quantitative portion of the study in which emissions, future emissions, expected mitigation, and expected purchase of carbon-offset credits is considered. The content analysis portion of the study utilizes randomly sampled groups in each of the strata.

The drive toward sustainability is a natural and noble one. It in all aspects of our lives, we see a recognition that we need to conduct more in depth and thoughtful planning of resource use and begin to take control of the energy and material flows that occur in our activities. A portion of this research is concerned with whether what is proposed actually moves the campuses in question carbon neutral operations or whether the end result is meaningful. In the planning process it is easy to lose sight of

the original goal and this research will act as a check on these plans and their outcomes.

Significantly there is always a motivation and ethical framework in which sustainability thinking takes place By reading for motivation and intent we will be able to sort the plans into different ethical frameworks and use that as criteria in evaluating effectiveness. Theoretically we can place bets on which framework will produce the most effective plan and ultimately we can test those theories as results and tracking data become available in the future. That groundwork is best laid now at out outset of these plans and the tracking and reporting regimes that will provide future research data.

There is often an impetus to want to reduce measurement of complex problems, like sustainability, into single numbers or metrics to make them easily digestible and comparable, such as the miles-per-gallon for automobile efficiency, which serves to reduce the 'greenness' of a vehicle to a single number but ignores all the mitigating, and arguably far more important factors. However emissions are measured and treated in these plans might create an effective or ineffective commensurability between plans or it might over simplify a complicated problem. In studying the carbon emissions measurement and mitigation methodologies we will improve future planning efforts. The quantitative portion of the study will put into context the scale and method proposed to achieve zero emissions; the content analysis portion will provide the context of the planning efforts.

Study Design

This study is a cross sectional retrospective non-experimental study employing both qualitative and content analysis methodologies.

The entire population is utilized in the emissions and mitigation section of the study, the population being manageable enough to examine and use all the available data from the plans. The study will look at the plans participating in the Climate Commitment at the time the study is conducted, approximately Spring of 2011. There is potential to continue the methodology in future studies to examine additional schools as they participate in the program and submit their plans but this research is aimed at the early planning efforts being made before substantive efforts have been implemented according to the plans. Examining the effects of the duration of participation in the program as well as progress will have to be left for future studies. Longitudinal studies can be conducted to follow the participating schools as they report progress in implementation. Additionally, future work can be conducted in examining particular school plans using the developed instrument and methodologies to focus and refine understanding of individual schools or at the behest of particular institutions. This research is a first step and will be taking a complete look at carbon emissions reported, planned growth, expected mitigation, and expected carbon-offset purchases, the content analysis portion examines a cross-section of a large data group at a particular point and will provide insight into how differing types of institutions are approaching their roles in achieving their goals.

This study's reference period is a retrospective one in that it's data set is the existing plans available from the ACUPCC. Future studies could broaden the research into prospective studies of future outcomes from plan implementation but that is beyond the scope of this study. There will be some effort to evaluate the potential success of the stated goals of the plans in the data set but only in so far as accounting for their

emissions estimation and mitigation strategies. The study data is retrospective in nature.

Non-experimental research involves retrospectively linking the effect to the cause in the experiment and does not allow for controlling the independent variable in order to test hypotheses. The goal is to examine the relationship between the ethical language and motivation of the participants and their carbon emissions and mitigation strategies as well as compare emissions measurement methodologies employed with their mitigation plans. This will all take place using the existing plans without the ability to further, experimentally, test the study's findings. Future studies could be conducted as experimental studies if there are strong results from this study and the study influences future planning efforts in a testable and comparable way.

Both quantitative and content analysis methodologies will be employed in this research. The first section of the study involving carbon emissions reporting and carbon mitigation strategies will be a quantitative analysis utilizing data from the entire population for direct comparison between strata and providing correlation analysis of data within each stratum.

Problems and Limitations

The data set is limited to institutions in the United States that have first chosen to be a member of the AACUP and secondly have decided to participate in the Climate Commitment program. Some participants in the program have not submitted plans or submitted plans of such a limited or incomplete nature as to render them useless for this study. Among those who have submitted the required data and substantive plans some have proposed mitigation strategies that do not utilize carbon-offset credits Those are included in the study as part of the range of approaches to emissions mitigation.

A study like this one has to address the problem of self-selection in the participant's data set. The United States hosts somewhere around 4800 colleges and universities. Of that group the current participation in the climate action plan initiative is about 680. An effort will be made to determine the source of this self-selection, what types of institutions are participating and what types are not in so as far to credibly address the problem of self-selection in the data set. More than likely a large number of those institutions not participating are either very small or very focused on a particular type of education to which the climate action plans would be difficult to apply such as urban institutions with discontinuous campuses, online schools, religious schools, or schools that for what ever reason have chosen not to participate. There is a range of types and sizes of institutions participating in the climate action plan program and the results of this research will apply to typical colleges and universities.

Additional reasons for non-participation include not seeing the program goals as imperative to the institutional mission, implementing another emissions reduction framework that does not fit the rigid goals and requirements of the Climate Commitment, or a belief that solutions will come about through extra-institutional means such as geo-engineering, carbon sequestration, or technological breakthroughs.

Population

The American College and University President's Climate Commitment (http://www.presidentsclimatecommitment.org/) represents over 680 colleges and universities and has created a set of guidelines and formats for creating comparable plans as well as a reporting system to keep track of the progress being made in implementing the plans. These approximately 680 colleges and universities make up

the population of this study. The population includes all types and sizes of institutions from community colleges to large and small public schools to private schools as well.

The motivation for joining this project and creating these climate mitigation plans is varied and sometimes well discussed and explained and sometimes not addressed in the plan documents. The institutional motivation for participating is of interest to this study and ascertaining the ethical relationship expressed by the institutions for the environment makes up the content analysis portion of this research. Motivation and relationship is important for a variety of reasons. The 'why' of an institution's actions can offer insights into their choice of emissions reporting and mitigation efforts, which are studied in the quantitative section of this project. In general we can say that motivation can be important in which efforts are implemented to reduce carbon emissions and provide for the future of the institution, particularly since the planning period is beyond the typical length of employment of those developing them; we can also imagine these efforts as a cynical result of legislative or popular pressure to “do-something” about climate change and energy efficiency. The source of that motivation, whether it is legislative, administrative, the result of a group, or the project of an individual should have some relationship to the ultimate plans and also the actual efforts towards emissions mitigation. Even without empirical results there should be some relationship between who is motivating the planning and what action is planned and potentially the actions taken. This study cannot determine that specific relationship but can begin to examine the issue.

Problem awareness is the first step in taking action to solve a problem. This population has taken that step, recognized the problem and committed resources to

plan to solve it. Taking the next step of committing resources to implementation will no doubt be predicated on the ability of the planning process and its products to convince decision makers of the desirability to implement the plan. So we have an interesting situation of a problem the institution's population is no doubt keen to solve and which by and large accepts the gravity and necessity of solving, and a planning effort that will not only find the most efficient and effective method of solving it but also be effective in convincing the rest of the community, administration, and the owners, board members, and/or legislatures of the goodness of their efforts.

The choice of colleges and universities for this study was not accidental. The large size of the data set, about 680 institutions participating, and the uniformity of the plans allows for direct comparison of at least some aspects of the plans. Colleges and universities offer a set of unique circumstances that also make them an interesting case in carbon mitigation efforts. They are centrally administered; this leaves planning more in the realm of dictate than consensus. Many of the plans were created by large and diverse working groups, representing different factions of the university community, professional as well as public; but the ultimate support, implementation, and success of these efforts will rest on the motivation of administration to fund and oversee their fruition. Compared to municipalities, local, state, national, or international planning efforts these are dramatically more straight forward projects and their plans much more definite and their success much more discernible. The scale of organization and oversight varies with differing problems. Peace between nations cannot be organized at the local level, it requires an international effort; similarly, school boards are almost all local or state in scale rather than the larger national or smaller neighborhood scale. For

whatever reason certain problems work better at different scales than others. Sustainability planning in general and carbon mitigation planning in particular may be best handled at the community scale and that is what we're seeing in these colleges and universities.

Colleges and universities offer an excellent case study in community carbon mitigation efforts. The first step in mitigation is measurement because we must know what we're trying to reduce, establish baseline carbon production figures and ascertain their sources. Being centrally administered as well as the majority of carbon emissions resulting from expensive energy consumption we can hope for excellent tracking and recording of energy consumption by these institutions. The source of carbon production estimates in these cases is an amalgamation of consumption figures rather than a direct measurement of carbon emissions. While this is a limitation for the planning groups it is most important to have consistency in the relationship between the baseline carbon emissions figures and their mitigation measurements over time. Even given that actual emissions may be different from the calculated emissions, as long as all sources of emissions are included and all mitigation efforts are accurately measured in a manner similar to the production method the result should be representative of the success of mitigation.

The question of what to include in emissions calculations is addressed in varying ways by the plans. As long as there is a consistency within each plan of what to include and measurement and what is addressed in mitigation then there will not be a problem. Some plans include commuter emissions and fleet vehicles and some do not. This seems to be the major factor either included or not and has a dramatic effect on the

emissions measured by each institution. The comparison of any particular member of the population to any other needs to be based not on absolute reported levels of emissions or mitigation but on a ratio of the two to remove these differing strategies from bearing on the consideration. There may be a revealing bit of information in the rates of commuting amongst schools and their likelihood of including those emissions in consideration. It might be the case schools with high rates of commuters might not include those emissions in their calculations or it might be the case that irrespective of the source of emissions the consideration in planning is to what degree and at what cost can emissions be reduced compared to their levels of emission. For instance, if carpooling and public transportation can be inexpensively used to reduce commuters then the cost per unit of reduction might be quite low and in that case a school may well decide to include those emissions in their plan.

Unlike many communities that have similar motivations, talents, and commitment; colleges and universities also have the funds or the power to raise the funds to accomplish virtually any goal imaginable. As a source of first line science and technology as well as the repository of human knowledge and understanding colleges and universities should be taking the reigns in solving the problem of carbon emissions. Funding through grants, endowments, public monies, and all level of finance mean that if the institutional mind is put toward implementation of these planning efforts the potential failure point should not be funding. The scope of the projects, fifty years, allows for all sorts of creative funding from long term investments to planning for future technologies to address the problem while simultaneously arranging the financing today for these future needs at a point where the funds are available and the technology can

solve the problem. How many dollars invested today would be required to solve this problem with 25 years to go 25 years from now? These are the sorts of questions only answerable by economists, scientists, and administration; most other communities lack these sorts of resources in their planning efforts.

Details in emissions are important. In the most basic case a population member may simple look at their power bills to ascertain the amount of emissions they are responsible for. This is an over simplification but the effort to root out all the sources of emissions can become quite onerous and if consideration is given to the embodied energy or materials in use on the campus it may become too complicated to accurately track and understand. There is necessarily a divide between a sufficient level of detail in emissions tracking and too much detail just as there is between too little. Our hope is that these plans not only take into account large and obvious emitters such as energy consumption, fuel use, materials consumption, and landscape development and maintenance; but also that the institution thinks creatively about where they may be emitting and how they can address rather than ignore that.

The method of emissions mitigation offers the most difficult aspect of these planning efforts. How, over the next fifty years and untold technological and policy changes, will they succeed in fulfilling their planned promise of today to reduce emissions to zero? That will be the most interesting part of the study. We can only hope that this hitherto unsolved problem of completely emissions reduction can be solved by what should be the most capable parts of our society. A grasp of technology, science, policy, population, and most of all an understanding of the changing face of our world are requirements in making these planning efforts. This population of colleges and

universities, like few other communities on the planet, should be capable of unique, innovative, and lasting solutions. The excitement of discovering the solutions reached by these institutions is palpable and their success or failure will be the first legacy of the 21st century.

We can absolutely see these efforts at the scale of colleges and universities as the first test case in community carbon mitigation efforts. If colleges and universities make headway in reaching their goals they can serve as test beds and models for other communities and larger and smaller scale groups to implement if not similar solutions at least similar planning efforts. This population represents the first of a future range of planning efforts. To that end it will be important to understand this population's set of motivations, efforts, and ultimately in a future study, their results. Societies as a whole tends to lag in implementation if not awareness of these types of large problems, allowing the idealistic and capable populations of colleges and universities solve societal, technological, scientific, and human problems first. The success of these herculean efforts will either reveal a future in which we can address carbon emissions in a successful way and retain our currently energy intensive quality of life with fewer resources or it will be a harbinger of more radical actions as energy and carbon conspire to change the way humans operate.

The community of colleges and universities is made up of trustees, legislatures (in the case of public institutions), administrators, faculty, staff, employees, suppliers and utilities, local government, and of course students. Different places place different levels of emphasis on these community members and their power and influence varied greatly but in general each has some ability to influence the process and action taken by the

institution. The largest group, and potentially the most vocal, is the student population, followed by the faculty. Colleges and universities tend to have an active, progressive, and innovative approach to community problems such as the subject of this study. This may be a reason they have been the first to adopt a large scale, coordinated, and comparable set of plans and future efforts to address the very large problem of climate change due to carbon emissions. If we think about how larger-scale efforts have so far had little consensus and success of defining planning to reduce carbon emissions in a dramatic way and if we consider that small scale efforts such as made by individuals to reduce carbon emissions simply are not substantial enough to make a difference we can see the community scale as being the best chance for success in reducing carbon emissions. The community scale could be large enough to make a difference and small enough to take action. The magnitude of the problem is such that even at this scale with its advantages and motivations, these planning efforts are still half-century efforts, larger and more daring than just about any other project in the recent past. The building of the great monuments of history required this level of commitment of time and resources but not of institutional transition, the great revolutions of history occurred more quickly and with great drama but out of necessity rather than foresight. A half-century of efforts based on a few years of planning and subsequent updates in an effort to completely change the workings of major institutions in coordination with the rest of society and continuing in their mission is comparable to the Manhattan Project and the Protestant Reformation occurring simultaneously. If anyone can accomplish it, it will have to be colleges and universities.

Selection Methodology

Most of the plans contain the key data points of enrollment and baseline emissions. The signatories analyzed in this study were screened by those institutions that had completed plan submissions (317 of 680.) Of the 317 submitted plans only those institutions reporting enrollment, baseline emissions, and business as usual emissions were included in the study, a total of 103 institutions. Reported enrollment from the Climate Commitment system was used throughout the study, though it should be noted that enrollments often differed from those reported by the Carnegie Foundation for the Advancement of Teaching Classification for Higher Education System. (Carnegie Foundation) Institutions analyzed in this study were divided into four strata by ownership, size, and majority of degrees awarded:

- 2-Year Public Institutions: 8 Institutions
- 4-Year Small Public Institutions, having an enrollment of fewer than 15,000 students: 35 Institutions
- 4-Year Large Public Institutions, having an enrollment of greater than 15,000 students: 21 Institutions
- All Private Institutions: 39 Institutions

The strata characteristics were determined based on common and easily defined distinctions in the institutions; these distinctions are hypothesized to lead to a range of emissions mitigation approaches and efforts.

There are no conclusions to draw about the many institutions of higher learning in the United States and of institutions belonging to the American Association of College and University Presidents who choose not to participate. All results, findings, and analysis only apply to the submitted plans. Sample selection from the population used the random number table method without replacement. (Kumar, 2005)

Variables

General Variables

Date of carbon neutrality

Student population of school

Type of institution: public or private

Type of majority of degrees awarded: bachelors or associates

Length of plan, number of pages

Who worked on developing the plan [categorical]

Variables in the Emissions Mitigation Section

Methods of emissions reductions [categorical]

Expectations for reduction in emissions given planned methods

Plan to handle future emissions due to growth or other factors [yes/no]

Position of the institution on the use of carbon off-set credits in reducing net emissions [yes/no; why]

How will progress be recorded and reported

Is there a feedback process for modifying the plan over time [yes/no]

Variables in the Content Analysis Section

Is there a definite ethical world view discernible in the plan [yes/no]

Imperatives language: “we have to”, “we must”, “we are required to” [quantity]

Hedging language: “if the budget allows”, “if the technology is available”, “when the time comes” [quantity]

Source of motivation for planning efforts [yes/no]

Measurement Procedures

This study utilized the data provided in the Climate Commitment program plans submitted from participating institutions. Of the roughly 4300 institutions of higher learning in the US, about 660 have committed to the program. The signatories analyzed in this study were screened by those institutions that had completed plan submissions, which was done by 317 of the 660. The list of participating institutions is available from the AACUP reporting web site, as is emissions and enrollment. The 317 plan-submitting institutions were divided into four strata reflecting enrollment, ownership, and majority of degrees awarded. The strata reflected what we believe to be the defining characteristics of how institutions will address their carbon emissions mitigation efforts. The division between 2-Year and 4-Year institutions reflects the majority of degrees awarded, the former being community colleges. The 4-Year Public group is divided into 'large' and 'small' based on enrollment with 15,000 students and above representing the large group and below that enrollment the small group. 'Private' refers to non-public institutions. All institutions fell into these four specific strata with the exception of one 2-year private college, the College of Menominee Nation, a tribal college of about 600 students in Wisconsin. They were included in the 2-Year group. The breakdown of the strata was chosen because it was these factors that were thought to provide the clearest demarcations between differing approaches to sustainability on campuses. The emissions mitigation plans of the Climate Commitment program are publicly available at the program website. Most contain the key data points of enrollment and baseline emissions. Reported enrollment of each institution differs, often substantially, from the institutions' websites or the Carnegie Classifications of Higher Education enrollment data. For the purposes of this study, the data reported to the AACUP was used.

The essential data for this study were: enrollment, total emissions, predicted future emissions if no action is taken, and planned level of or lack thereof of purchased carbon-offset credits. Institutions providing all of this data are herein referred to as having *full data.* While having full data for the purpose of this study reflects a complete evaluation of carbon emissions mitigation planning, the choice by some institutions to not utilize PCOCs did not exclude them. The failure to discuss or mention this common method of emissions migration in their planning efforts did exclude those institutions from the study. This research study does not imply that lack of discussion or use of purchased carbon-offset creates an incomplete or unworkable plan, just that plans analyzed in this study met certain criteria. It is not the purpose of this study to advocate for or against the use of PCOCs, but to examine how the use of credits relates to other structural factors of the institutions that have decided to utilize them or not.

The strata were chosen based on an analysis of which factors showed the most differentiation amongst the institutions. Enrollment and ownership was used to sort the data. Among the strata, only 2-Year institutions saw a negative correlation between enrollment and submission of full data needed for this study. The other three strata each showed a stronger correlation between mean enrollment and enrollment of those providing full data. Public 4-Year institutions were the most likely to submit plans containing full data and for those higher enrollments indicated increased likelihood of submitting full data. A breakdown of strata along the lines of enrollment demonstrated that lower enrollments tended to have less complete data reported. The addition of the ownership criteria and the further split of the Public 4-Year groupings were introduced

for the purpose of examining how enrollment influenced the intention to purchase carbon-offset credits. (Table 3-1)

The sample was further refined to include only those institutions whose plans included the data required for the study. The breakdown of the strata is shown in Figure 3-1. Individual institutional plans were assessed through a critical analysis of plan content using a random sample of 10% of each stratum that included full data. This critical reading provides the basis for the discussion of the plans contents below.

Data on business-as-usual (BAU) emissions was used to show expected growth in institutional carbon emissions and the rate of implied growth of operations or enrollment that would drive an increase in emissions over time. These levels of emissions rates are generally straight line estimates based on a few past years of growth and do not reflect the capital and growth planning of the institutions. A stronger planning effort on the part of the institutions would have included the capital, financial, and growth plans of the institutions, which often take place over similar time periods and a similar scale. The business-as-usual case is necessary because the end date level of emissions, defined by the program as zero, is the rate of increased emissions against which mitigation efforts must work. To mitigate the start date emissions by the end date would only mitigate a fraction of the total emissions at that end date.

Purchased Carbon Offset Credit Correlation Analysis

Purchased carbon-offset credits are utilized in most plans in a number of ways. They are used as a constant strategy to reduce net emissions by purchasing a set amount each year or a proportion of emissions as other strategies are introduced. They are used only at the end date to eliminate remaining emissions after all other strategies have been implemented in order to fulfill their program commitments. In a minority of

plans they are used to mitigate specific emissions, most often emissions from air travel of faculty or staff. The use of purchased carbon-offset credits for this specific purpose most likely represents an institutional decision to apply this form of emissions reduction to the most intractable emissions problem rather than rely on calculating net emissions from all activities and allowing mitigation efforts of any kind to offset emissions of any kind. Targeting specific mitigation measures to specific emissions is one strategy employed as opposed to the 'big-pot' strategy in which mitigation is not tied to specific emissions but works against total emissions. This distinction was never explicit or consistently described within plans and is stated here as an observation of the approach to emissions mitigation. Plans in the former group tended to enumerate specific buildings or emissions sources and target them for specific changes, while the latter approach led to introducing projects generally targeted toward the goal of emissions mitigation. All the plans were a mix of these two strategies.

Data on purchased carbon off-set credits and BAU emissions were not reported as part of the AACUP reporting system. Those data were extracted by critical analysis of the plans themselves. The consistency of the AACUP reported data contrasted with the ad hoc reporting of the other relevant data. In some cases the data for the use of PCOCs was provided in the discussion, in others it was provided in the tables or data but not discussed. The 2-Year Public strata data set was excluded from the correlation analysis because only one of the institutions indicated the use of PCOCs.

Not included in this study is an analysis of expected economic issues with PCOCs. Part of the appeal and widespread adoption of this strategy is the ease with which they can be planned for and accounted for. PCOCs will have a specific price and effect, they

will be easily knowable, accounted for, and implemented. In cases where some accounting for the expected cost was conducted the expectation of the cost of credits in a carbon market was dramatically variable to the point of not making a meaningful estimate of market price for the carbon credits. Many plans offered logical inconsistencies in their estimation of costs compared to other capital projects to achieve the same ends. For instance, estimating the cost of a ton of carbon emissions mitigated through a particular capital project at $500 and an equivalent PCOC at $2. Those cursory estimates are not the focus of the planning or this analysis and are therefore not included in the analysis.

Content Analysis

Content analysis is a quantitative methodology. By counting words or phrases we can compare individual items to others but the method is limited in that it cannot draw conclusions about things outside of the case study. The content analysis method is useful for describing the participating strata and in comparing those strata to each other. The method is used in this study to test for the independence of the frequency and type of language used and looks for characteristics of the strata. The content analysis template used to record the data can be found in Appendix B. The following steps were used in developing the content analysis instrument and in implementing this portion of the study and are based on a methodology developed at the Colorado State University by Mike Palmquist (Busch, et al., 2005):

1. Decide the level of analysis:
    a. Coding is for words or short phrases that include hedging or imperative language.

b. Ethical and motivational coding should be explicit explanations or descriptions of the motivation and the source of that motivation.

2. Decide how many concepts to code for:
    a. Four concepts total
        i. Imperatives
        ii. Hedging
        iii. Ethical
        iv. Motivational
3. Decide whether to code for existence or frequency of a concept:
    a. Coding for frequency in the case of hedging or imperative.
    b. Coding for existence in the case of ethics and motivation.
4. Decide on how you will distinguish among concepts:
    a. The frequency-coded concept will be grouped into the two concepts and a list kept of the phrases used for each type of content.
        i. Hedging language are phrases such as “if the budget allows”, “if it is possible”, “in the future we may”, or other phrases that suggest an ‘out’ for pursuing the planned program.
        ii. Imperative language are phrases such as “it is our duty to”, “we must”, “we are committed to”, and other phrases that suggest an essential act or commitment to an act.
    b. The existence concept will be recorded as a single event and in a single form.

i. The presence of ethical or motivational language of any kind will be recorded as ‘present.’ Notes on the nature of those ethical and motivational drivers are kept for use in future research but are not utilized in this study.

5. Develop rules for coding texts:
    a. Words and phrases will be consistently assigned a group or validity under the existing content.
    b. In order to be coded in any category a phrase must:
        i. Be in the plan itself, captions, text, etc.
        ii. Appendixes are excluded from the content analysis.
        iii. If a phrase is repeated in any context it is recorded as many times as it occurs.
        iv. Phrases must be directly related to the plan’s topic of $MTCO^2e$ mitigation. For example, phrases expressly related to recycling are not counted.
        v. Phrases lacking specificity as to their subject are assumed to be on the plan topic of mitigation and are included.
6. Decide what to do with irrelevant information.
    a. Irrelevant information (such as language explicitly on topics other than the subject of the plans) will be ignored. (Weber, 1990)
7. Code the texts:

a. The analysis coding of the texts occurred in a consistent and continuous manner by an individual researcher in order to maintain consistency and comparability of the data.
b. Coding was conducted manually without the use of coding software with the results and other relevant details of the plans noted in a spreadsheet.

8. Analysis (methodology is further explained in this chapter with this section describing the general process):
    a. The content analysis is related to the emissions analysis section both within the strata and between the strata.
    b. The content analysis is examined using the Chi-Squared and Fisher's Exact tests to determine the level of dependence in the strata variables and the results of the content analysis.

Statistical Methods for Content Analysis

The results of the content analysis were distilled from the form given in Appendix B to a data set for each of the four stratum.

The choice of the Pearson's Chi-Squared and Fisher's Exact tests was made in consultation with Dr. Michael Daniels in the Department of Statistics. (Figure 3-2, Figure 3-3) We considered the use of ANOVA analysis but decided on the Chi-Squared and Fisher's Exact tests because of the small nature of the data set and the prevalence of categorical data. The analysis was carried out in accordance with the methods described by Alan Agresti in *An Introduction to Categorical Data Analysis.* (Agresti, 1996) The Chi-Squared test was used to determine the independence of variables in the data set rather than as a test of goodness of fit. The null-hypothesis for each of the Chi-Squared tests was that there was an independent relationship between the

variables. When the Chi-Squared test rejected the null-hypothesis and confirmed the alternate hypothesis (dependence between the variables) a Fisher's Exact test was used to compare each of the strata distinguishing characteristics to further determine if any of the individual characteristics played a stronger role in determining dependence than any other. In the case of examining multinomial data the data was divided into bins describing a histogram like distribution of the data.

The results of the Chi-Squared and Fisher's Exact tests demonstrated the strength of the relationship between the categorical data collected in the content analysis and the likelihood that relationship extends to the rest of the population. Those test results provide for the data to describe the relationships that exist in the types of institutions and the ethical, motivational, imperative, and hedging content of their plans.

The content analysis also included additional tests. The number of statements was normalized for the length of plans in order to see if a relationship was more evident in the relative quantity of statements rather than the absolute number of statements. The normalized mean number of statements per page was also used to create histograms describing the numbers of hedging and imperative statements present.

The content analysis was used to describe a statistical norm for each of the stratum's use of language and then compare the expected use of language to the mean measures of emissions per enrollment and per emissions/unit of building space.

Table 3-1. Breakdown of institutional strata and relevant sorting data.

Strata	Percent and number with full data submission	Mean enrollment of full strata	Mean enrollment of institutions providing full data
Public 2-Year	11%, 8	9860	7895
Public 4-Year Small	43%, 35	9077	10898
Public 4-Year Large	46%, 21	27937	31143
Private	15%, 39	3795	4733

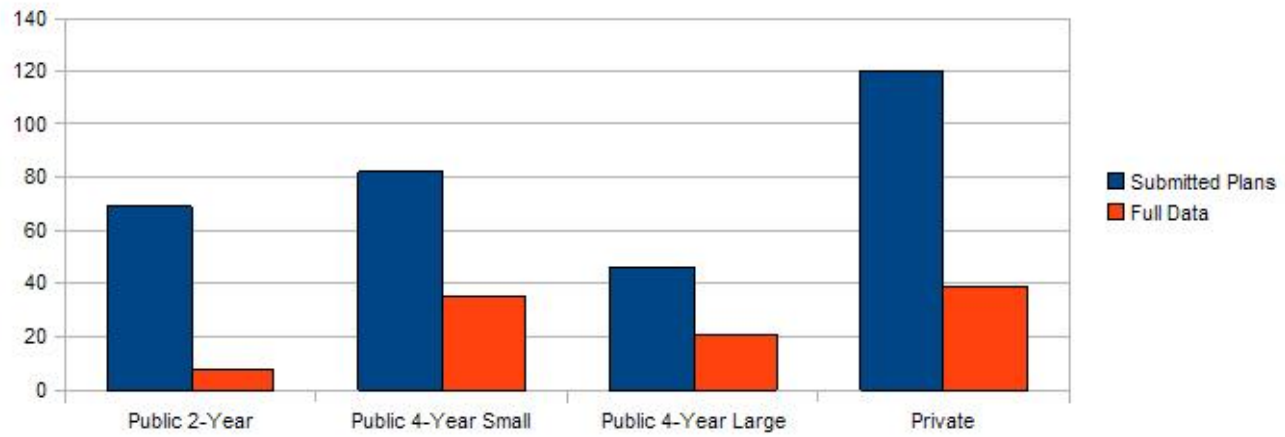

Figure 3-1. Breakdown of strata showing proportion of institutions submitting complete data needed for the purchased carbon offset analysis portion of this study.

$$X^2 = \sum_{i=1}^{n} \frac{(O_i - E_i)^2}{E_i}$$

Figure 3-2. Pearson's Chi Squared.

$$p = \frac{\binom{A+C}{A}\binom{B+D}{B}}{\binom{N}{A+B}} = \frac{(A+B)!(C+D)!(A+C)!(B+D)!}{A!\,B!\,C!\,D!\,N!}$$

Figure 3-3. Fisher's Exact Test.

Table 3-2. Strata Content Analysis Data Table

Institution	Enrollment	Emissions	Date of Neutra	Length of Plar	Imperative Ph	Hedging Phra	Ethical Langu	Motivational L

CHAPTER 4
RESULTS

Strata Comparison and Classification

The first analysis used a strata comparison between enrollment, current emissions, and future emissions in a BAU case.

Correlation demonstrates the degree to which two factors are related, this study included two sets of correlation analysis between the four strata. Correlation analysis of factors was consistent between the four strata. Strong to very strong correlations were found between baseline emissions and BAU case. Strong correlations between this data in the four strata demonstrate that there are similar expectations about future emissions in a BAU case based on current emissions regardless of size and type of institution. Enrollment data for 4-Year Public Large institutions reported far larger emissions per enrolled student compared to the other strata. (Figure 4-1) The lowest correlation was between enrollment and baseline emissions in the 4-Year Public Large strata. (Figure 4-2)

The mean expected emissions growth rate was analyzed with outliers, those institutions reporting expected emissions growth rates above 1000%, removed. The assumption is that unusually high emissions increases were the result of typographical errors since the unusually high rates were not addressed in the plans. Expected growth in enrollment was not reported, but was extrapolated from expected growth in emissions assuming a linear relationship between enrollment and emissions. Nearly all institutions expected their BAU emissions to grow from their baseline, with outliers reporting small percentage drops in BAU emissions compared to the baseline. A few reported drastic reductions in BAU rates, again, most likely due to typographical errors. The assumption

of typographical errors producing expected growth in the range of thousands of percent could be accurately reported by the respective institutions, if so, this behavior would be the subject of a future study. (Table 4-1)

The use of emissions per student, emissions per square foot of building space, or other relative measures of efficiency in institutional emissions shows the different strata do significantly vary in their emissions in a relative measure that is independent of enrollment. The smallest institutions, private ones, have the highest emissions per student. Because the Climate Commitment's goal is net zero of emissions, the efficiency or relative quantity of emissions would not affect whether that goal is achieved. Even a very high level of efficiency in terms of services provided per emissions would still represent a non-zero set of emissions and therefore not achieve the commitment. Calculations that rely on relative levels of emissions can contextualize the respective planning of the institutions but are not themselves a measure of effectiveness in fulfilling the commitment.

A moderately strong linear relationship was found between enrollment and baseline emissions in each stratum. The greatest range is seen in the 4-Year Public Large strata. The relatively high amount of emissions per enrollment in the Private strata can be partially explained by a few outlying institutions while most are in the same range as institutions with similar enrollments. (Figure 4-3)

Normal distributions of the population in total baseline emissions (Figure 4-4) and in emissions per enrollment (Figure 4-5) are provided to demonstrate the distribution of emissions within institutions of the study. In each case the distributions skew right.

Expected use of Carbon Offset Credits

The analysis indicates that reliance on the use of PCOCs to reach the goal of eliminating carbon emissions from institutional operations is not expected in the 4-Year Public Small strata. Factors affecting this could be ethical decision making of the institution representing the planners and administrators expectations of budgeting, technology, or behavioral factors.

Expected growth rate did not correlate to use of offsets. Use of PCOCs is seen as a separate part of the carbon emissions mitigation planning process rather than associated with rate of growth. The expectation of the institutions must be that as they grow, whether quickly or slowly, they can effectively mitigate new emissions rather than rely on PCOCs to mitigate growth. The lack of correlation between growth rate and the use of PCOCs could be explained by several factors. The institutions could be expecting future growth in the form of new construction and campus expansion will be more efficiently implemented than existing infrastructure. This is a reasonable expectation and one that is described in nearly all of the plans. A large portion of emissions comes from generated electricity, an emissions source dependent on local utilities and rarely directly controlled by the institutions. However, since institutions are large customers and consume a great deal of power, varying with factors of location and type of institution, they may exert influence over utility infrastructure alternatives in the future. Institutional expectation plays a role in reducing net emissions even as net consumption grows. The relationship between enrollment and rate of emissions offset of PCOCs in each stratum indicates the use of PCOCs is not influenced by size of institution. (Tables 4-2, 4-3, and 4-4)

Rate of growth and enrollment are only marginally related to expected use of PCOCs, the primary factor having a positive significant correlation of emissions is expected BAU emission, which itself correlates to baseline emissions. These quantities of emissions represent an indicator of the expected use of PCOCs to fulfill the institutional commitment to eliminating emissions.

The significance of the correlations was tested using a two-tailed t-test. In each stratum there was a significant correlation between BAU emissions and baseline emissions. In the 4-Year Public Large and Private strata there was a significant correlation between BAU emissions and the expected use of offsets. The 4-Year Public Small strata showed no correlation between BAU emissions and expected use of offsets. There was no significance found in the other correlations. Expected rates of growth did not correlate to the expected use of PCOCs.

Content Analysis

The findings of the Pearson's chi-squared and Fisher's exact test are summarized in Table 4-5 and 4-6 respectively. The analysis tables are given in Appendix L.

Of the 14 Pearson's tests two were sufficient to reject the null hypothesis and to demonstrate a dependent relationship between the variables. The first of those is the test of dependence between the four strata and whether or not ethical language was present in the plan document. (Table L-1) The other forms of language (hedging, imperative, and motivational) did not show any dependence individually, but the other test finding of dependence used the variable of the presence of any language and did find dependence. (Table L-8)

The two dependent findings were then divided into four Fisher's exact tests by combining and comparing the strata with the same ethical language and presence of

language variables to determine which factors were responsible for the finding of dependence. The findings are summarized in Table 4-6.

In the first set of findings, that of dependence in the presence of ethical language, the only factor of the strata that showed dependence in the finding was the size of the 4-year public stratum.

In the second set of findings, that of dependence in the presence of any of the tested language, none of the tested factors were found to be the source of the dependence.

The null hypothesis of independence was found in all the remaining tests including when the use of language was normalized for the length of plan (Tables L-11 and L-12), and when presence of language was distributed into categories as might be done in constructing a histogram distribution of the phrase counts. (Tables L-9 and L-10)

Total imperative and hedging phases per page are shown in Figure 4-6 and demonstrate the rate at which phrases were recorded when plan length is taken into account.

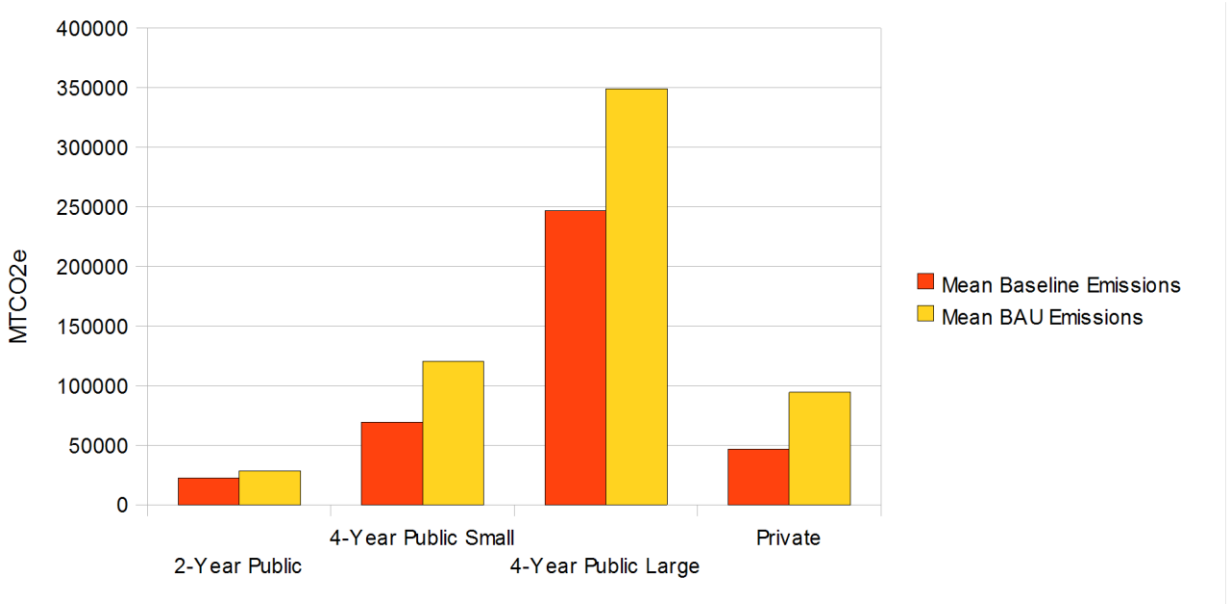

Figure 4-1. Baseline and BAU Emissions.

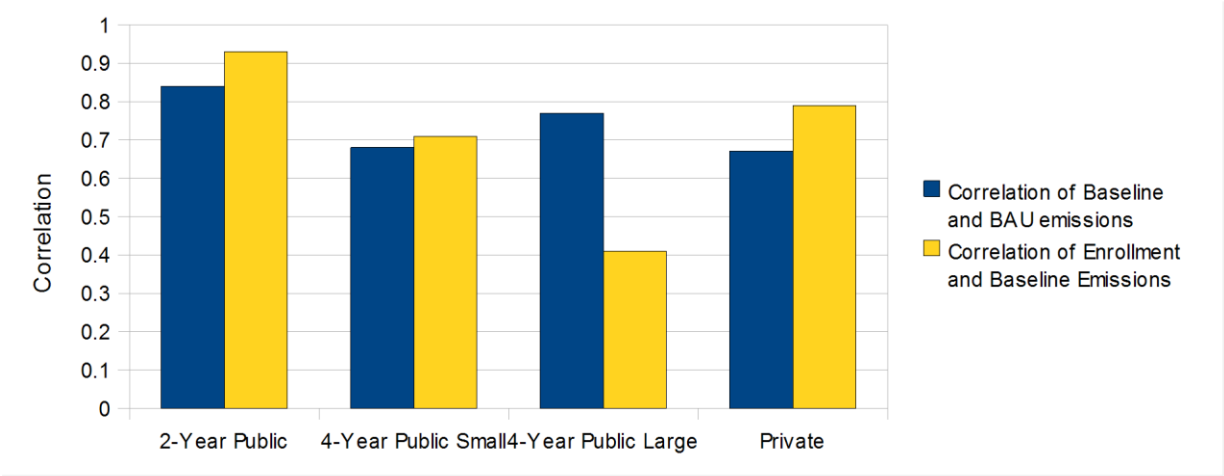

Figure 4-2. Correlation of Baseline and BAU Emissions with Correlation of Enrollment and Baseline Emissions.

Table 4-1. Expected growth in enrollment and emissions for study population.

Strata	Mean Enrollment	Emissions Per Student	Expected Growth of Emissions	Projected Mean Enrollment
2-Year Public	7,896	3.47 MTCO2e	34%	10,580
4-Year Public Small	10,898	5.94 MTCO2e	77%	19,290
4-Year Public Large	31,143	8.16 MTCO2e	40%	43,600
All Private	4,733	8.49 MTCO2e	34%	6,340

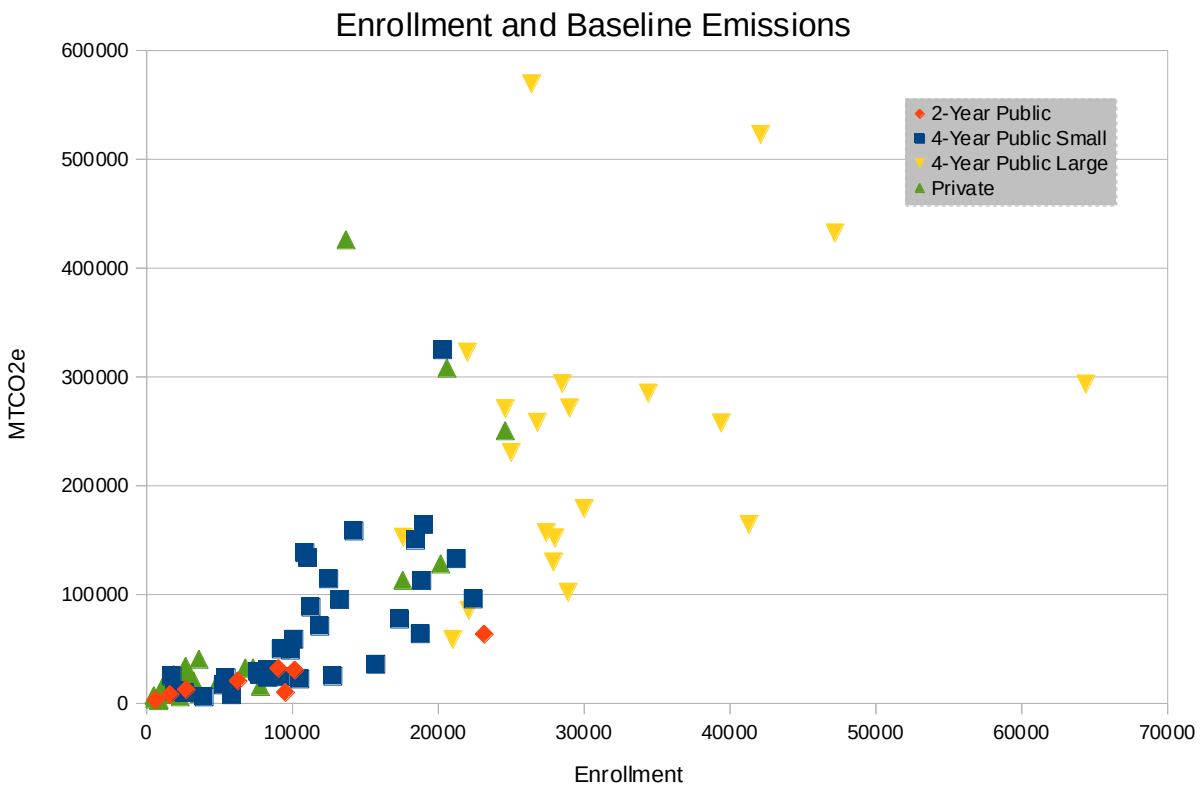

Figure 4-3. Enrollment and baseline emissions scatter plot of all four strata.

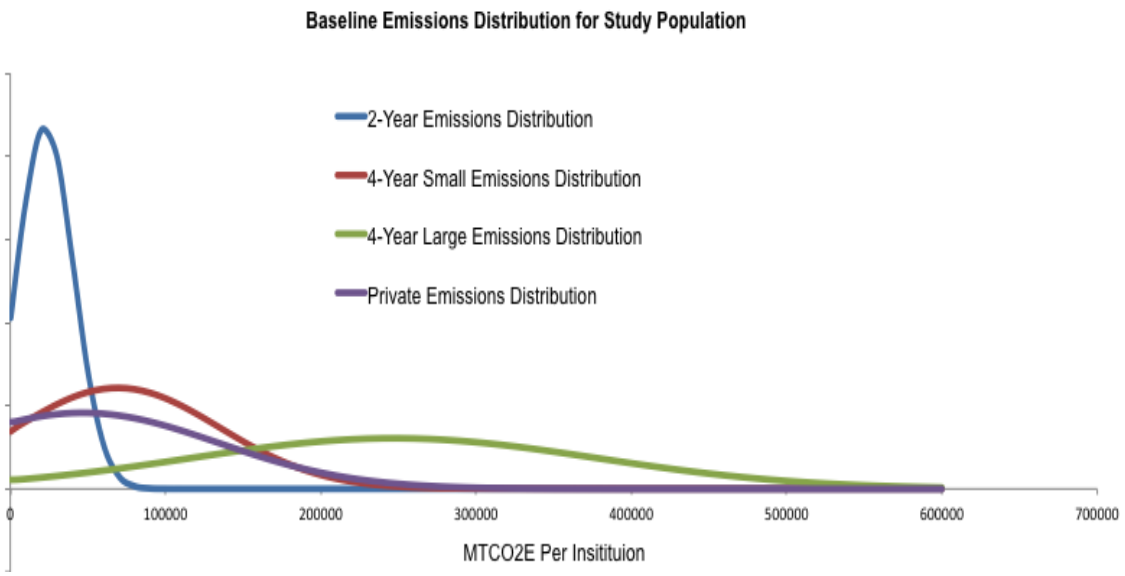

Figure 4-4. Baseline Emissions Distribution for Study Population

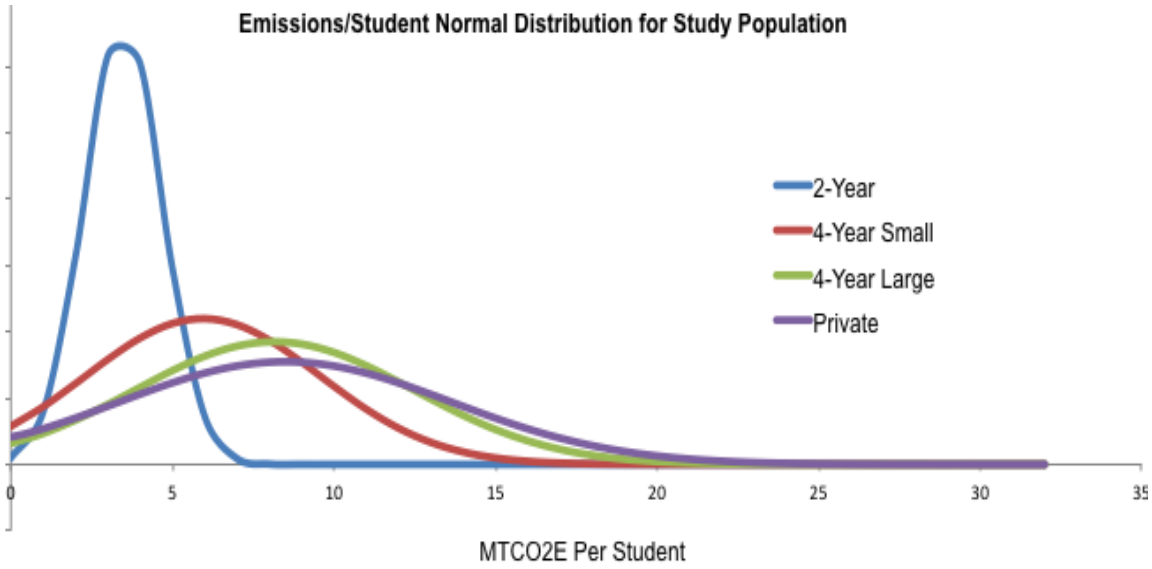

Figure 4-5. Emissions/Student Normal Distribution for Study Population.

Table 4-2. Correlation analysis for 4-Year Public Small strata.

4-Year Public Small	r	df	p
Correlation of BAU Emissions Growth and Proportion of Offsets at End	-0.03	33	0.8642
Correlation of BAU Emissions and Quantity of Offsets at End	0.06	33	0.7321
Correlation of BAU Emissions and Baseline Emissions	0.68	33	0.001
Correlation of Enrollment and Percent of Emissions Mitigated by Offsets at End	0.09	33	0.9591

Table 4-3. Correlation analysis for 4-Year Public Large strata.

4-Year Public Large	r	df	p
Correlation of BAU Emissions Growth and Proportion of Offsets at End	-0.15	19	0.5163
Correlation of BAU Emissions and Quantity of Offsets at End	0.58	19	0.0058
Correlation of BAU Emissions and Baseline Emissions	0.77	19	0.001
Correlation of Enrollment and Percent of Emissions Mitigated by Offsets at End	0.12	19	0.6044

Table 4-4. Correlation analysis for Private strata.

Private	r	df	p
Correlation of BAU Emissions Growth and Proportion of Offsets at End	-0.07	37	0.6720
Correlation of BAU Emissions and Quantity of Offsets at End	0.75	37	0.001
Correlation of BAU Emissions and Baseline Emissions	0.67	37	0.001
Correlation of Enrollment and Percent of Emissions Mitigated by Offsets at End	0.09	37	0.5858

Table 4-5. Pearson's chi-squared test results summary table.

Test title	DF	P-Vale	Ind/Dep	Ref. Table
Ethical Language Chi-Squared Test	3	0.047	Dependent	L-1
Motivational Language Chi-Squared Test	3	0.079	Independent	L-2
Ethical Language Expected Distribution	3	1	Independent	L-3
Motivational Language Expected Distribution	3	0.8	Independent	L-4
Hedging or Imperative present	3	0.143	Independent	L-5
Imperative Language Chi-Squared Test	3	0.393	Independent	L-6
Hedging Language Chi-Squared Test	3	0.155	Independent	L-7
Language Present	3	0.02	Dependent	L-8
Imperative Histogram Distribution Chi-Squared Test	9	0.6	Independent	L-9
Hedging Histogram Distribution Chi-Squared Test	9	0.949	Independent	L-10
Imperative Normative Histogram Distribution Chi-Squared Test	9	0.164	Independent	L-11
Hedging Normative Histogram Distribution Chi-Squared Test	9	0.268	Independent	L-12
Stated Neutrality Date Data Chi-Squared Test	3	0.635	Independent	L-13
Ethical or Motivational Language Present	3	0.129	Independent	L-14

Note: Each test utilized the four strata as one variable and a set of categorical data described in the title of the test.

Table 4-6. Fisher's exact test of strata combinations and presence of ethical language.

Test title	DF	P-Value	Ind/Dep	Ref. Table
Fisher's Exact P for 4-Year Publics	1	0.049	Dependent	L-15
Fisher's Exact P for 2-Year vs 4-Year (all)	1	0.089	Independent	L-16
Fisher's Exact P for Public vs Private	1	1	Independent	L-17
Fisher's Exact P for 4-Year Public vs Private	1	1	Independent	L-18

Table: Fisher's exact test of strata and presence of any language

Test title	DF	P-Value	Ind/Dep	Ref. Table
Fisher's Exact P for 4-Year Publics	1	0.55	Independent	L-19
Fisher's Exact P for 2-Year vs 4-Year (all)	1	0.106	Independent	L-20
Fisher's Exact P for Public vs Private	1	0.123	Independent	L-21
Fisher's Exact P for 4-Year Public vs Private	1	0.368	Independent	L-22

Note: Test title reflects the variables use in each test, the other variable is presence of any language.

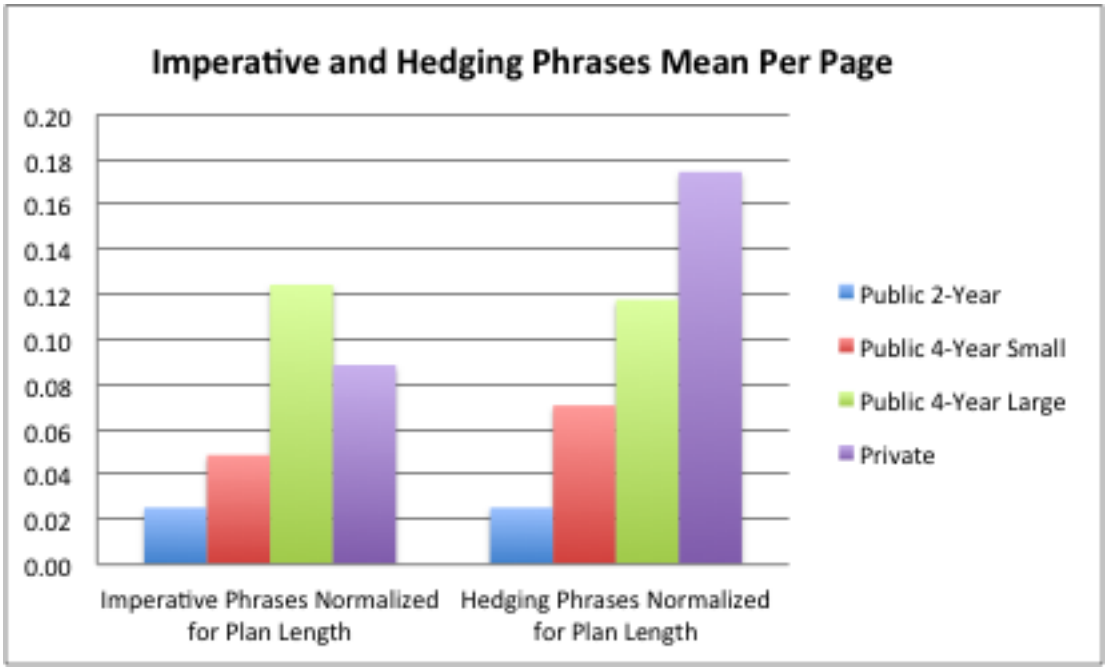

Figure 4-6. Imperative and hedging phrases mean per page.

CHAPTER 5
DISCUSSION AND CONCLUSION

Discussion of The Population Analysis

These plans suggest a variety of approaches toward carbon mitigation, but the most common path toward emissions elimination fall into three categories and representing the major sources of campus emissions: transportation, building operations, and growth.

Carbon emissions from transportation include commuters, official travel, and intra-campus travel. Campus plans suggest using traditional strategies, such as, encouraging car-pooling, providing bicycle paths, and increasing mass transit availability. Official travel consists mostly of faculty and administration traveling for conferences, research, or business. The only suggested solution specifically aimed at mitigation of air travel was the purchase of carbon-offset credits. Increasing the availability of options for travel within campus includes alternative fuel buses, displacing commuter vehicles with bicycles, and increased efficiency of transportation. The common thread in each of these strategies to reduce emissions is that they don not eliminate emissions; they only increase the efficiencies of existing approaches. Increases in efficiency alone cannot reach a point of zero emissions and physical and technical barriers exist that create diminishing returns in efficiency as technology improves. The mandate of the Climate Commitment essentially requires the elimination of or offset of the use the majority of energy derived from sources associated with carbon emissions. Emissions from transportation tend to account for a larger share of emissions from commuting in the 2-Year Public strata.

The major source of emissions from campus operations is the built environment of the campus itself. Buildings are great metabolizers of resources, both the material resources that construct them and the energy and water that makes them environments for people and production. Services provided in buildings include heating and cooling, water supply, waste treatment, lighting, classroom technology, elevators, security, communications, and maintenance, all of which consume energy. Campus buildings consistently represent not only the largest portion of energy use and greenhouse gas emissions but also represent the best opportunities for reducing carbon emissions. Older buildings can be retrofitted to reduce energy use and emissions. Many of the oldest buildings, the most inefficient on campuses today, were at one time the *most efficient* and probably more efficient than even the newest and most advanced buildings constructed today. Buildings predating air conditioning, classroom technology, and elaborate electrical systems would have utilized very little electricity in their original state while still providing the essential campus function as a place for instruction and many forms of research. Lighting was their main energy use and lighting is one area in which efficiency improvements have been dramatic in the transition from incandescent lighting to fluorescent and in the coming move toward potentially even more efficient LED lighting. While removing climate control systems such as mechanical cooling and heating may be a dramatic way to reach a state of zero emissions, a focus on the sources of emissions may spur the development of alternative strategies. A better question than 'how could we do as much as we do with less' would be 'how can we do as much as we need with what is available.' Its the question of efficiency versus effectiveness. Even as we manage to provide additional services with less energy, by

increasing efficiency, the quantity of services continues to increase. The Climate Commitment's goal of zero emissions cannot be achieved by increase efficiencies alone, it requires a focus on the source of emissions and their elimination, providing building and campus services in an effective manner is a secondary concern rather than the primary focus. In other words, increasing efficiency is a proxy measurement for the actual goal of providing effective services with available resources based on the emissivity of those resources. The focus of planning efforts on increasing efficiency is not sufficient to fulfill the program commitments.

The Climate Commitment provides many suggested paths and aspects of planning toward the zero emissions goal; one of these is to require all new building to meet the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Silver standard or equivalent. The LEED certification program can produce buildings providing the same services with lower energy use than a standard code compliant building and thus lower emissions from operations per some standard of use, generally carbon emissions per square foot of building or carbon emissions per student. The addition of newer and more efficient buildings certainly help lower normalized emissions somewhat, but the end result is a building that is more efficient than buildings a few decades old but probably uses more energy per square foot. More important than the problem of efficiency is that unless some less efficient buildings that utilized more energy per the same services provided are closed down, the net quantity of carbon emissions from building operations will increase. Increasing efficiency in this way, and measuring progress toward the net zero goal of emissions per area or per user, works against the emissions elimination goal of the program. The dramatic rise of business-as-

usual emissions reported in the plans demonstrates the trajectory of emissions without any intervention.

Growth is a fundamental aspect and problem within these planning efforts. Worldwide, despite decades of increasing efficiencies and awareness of problems in energy and emissions, emissions have continued to rise (Boden & Marland, 2009.) Increasing efficiencies and efforts to reduce and clean up energy production and use has not reversed the trend of rising emissions per year. This problem is one of growth and expectations, while we may be getting more from less, there are also a lot more of us, and we all expect more from our buildings, technologies, and lifestyles. Growing affluence and reluctance to change have exacerbated the problem. This culture of growth extends to colleges and universities. Trustees, alumni, students, prospective students, governance or ownership; all these stake holders expect growth from their institutions. More students, bigger buildings, better technology, and more extensive operations are the norms in institutional planning (Schofer & Meyer, 2005.) How do these plans deal with growth when accounting for their carbon emissions over time? Those that do address growth make estimates, sometimes based on given assumptions, sometimes just extensions of current trends, and some conspicuously assume growth rates smaller than current ones (current growth occurring in a time of reduced economic activity no less) or smaller than other institutional planning documents expect.

It is difficult to expect the goal of zero emissions to be achievable given current planning efforts focused on efficiency and growth. The expectations of nearly every participant in the program include either one or both of the following: the use of

purchased carbon-offset credits or a technologist assumption. Carbon-offset credits are commodity priced credits expected to be available sometime in the future traded in a price-adjusting market, similar to other commodities markets. There are currently carbon-offset credits available from various sources, but most have weak systems of certification or verification. The current ad hoc market does not represent a substantial resource in the reduction of emissions (Lovell & Liverman, 2010). The use of purchased carbon-offset credits is assumed in many of the plans as a way to eliminate whatever emissions are remaining at the end date in order to fulfill the promise of the Climate Commitment. Estimates of pricing and availability of those credits varies wildly. The forces of supply and demand along with regulation and the methods employed to create the credits could easily conspire to make substantial credit purchases impractical.

Nearly every plan includes a technologist view of carbon emissions reduction. That is to say, none of them describe a plan to eliminate emissions given current technology; they all assume some future undefined technology will become available to achieve the goals of the program. Taken to an extreme not reached in the plans, the technologist assumption reaches a point of infinite technology providing infinitely available services for infinitely small resource inputs.

Embodied by the work of Ray Kurzweil on what he calls the 'technological singularity,' an event set to occur in 2045 at which point the intelligence of machines surpasses that of humanity leading to a crescendo of all consciousness becoming one with an intelligent universe (Kurzweil, 2005.) It is an intriguing coincidence the Kurzweil's prediction coincides with the Climate Commitment's promised neutrality date. While assuming some technological progress over the decades of plan implementation

is appropriate, the degree to which reliance is placed on assumptions of technological adaptions and the trajectory of efficiency improvements is worrisome.

Lost in much of these planning efforts was the sheer scope of the commitments the program requires. Carbon emissions and the energy use they closely parallel are essential components of institutional operations at colleges and universities. Current carbon emissions control strategies focus on increased efficiency and new technologies to try and reduce emissions. Another way to think of the problem is to work backwards: begin with the premise that these institutions could achieve their goal by simply stopping the use of energy in any form, from purchased electricity, to campus commuting, landscaping equipment, waste treatment, fuels used for cooking, and emissions from research activities. A planning process that begins from the premise of zero energy use is a far cry from current practice in emissions *mitigation*. From this theoretical baseline, the institution operating from zero emissions, planning could then work upward, determining how to run operations on the energy available from non-greenhouse gas sources such as wind, solar, biomass, tidal, geothermal, or nuclear. Each institution would be plotting an individual course in examining available resources and what kinds of activities they could perform with those resources. Transportation of commuters to campus and faculty to conferences and field research would present a host of new challenges, again, each tailored to the institution. Imagining students bicycling in to campus is easy enough but professors may not be willing to sail to conferences over seas.

The Climate Commitment is a terribly ambitious program. Achieving its goal implies a dramatic change in the way these intuitions organize, manage, and operate.

The scope of the plans' implementation increases over the course of nearly half a century. It is not uncommon for institutions to prepare growth and capital plans that span similar periods. While many of these plans are similar to previous planning, this planning effort is fundamentally different. This planning extends to all areas of institution operations and culture. It will require a through rethinking of operations and possibly rebuilding in order to achieve the goal of the zero emissions state described earlier, but doing so in a way that continues to provide the level of services expected of a modern institution of higher learning. The data presented describe the current and expected future state of enrollment, emissions, and emissions growth if current practices continue. The methodology of the plans is to work backwards from that future scenario to eliminate emissions by increasing efficiencies, implementing expected technological changes, and other measures including purchasing carbon-offset credits. As these plans are implemented and updated as living documents, generations of students will pass through the institution's gates, faculty will turn over, administrators will come and go, and cultural, environmental, and technological changes will dramatically reshape the world in which these institutions operate.

Colleges and universities occupy a unique place in society and are well suited to be the first institutions to undertake of carbon neutrality. They have large progressive populations, extensive human resources, and the control over infrastructure required to implement this type of planning. Being on the forefront of massive public and private efforts to mitigate emissions is a natural fit and will serve to provide the vocabulary and methodologies used in similar efforts elsewhere. The scale of institutions participating in this program range from an enrollment of few hundred to about 65,000 students. This

range mimics other human institutions such as businesses, communities, municipalities, governments, civic associations, and religious groups. By conducting carbon emissions mitigation planning, initiating the carbon emissions reduction process, and making regular reports on progress, this program is providing a road map for others to follow in developing and implementing their own plans for mitigation. A combination of a variety of approaches, understandings, and methodologies sure to be implemented; with a consistent reporting system and clear and stringent program goals make the Climate Commitment a preeminent emissions reduction program and assuredly a baseline program to compare future coordinated emissions reduction efforts.

Discussion of Offset Purchase Analysis

This research is important because it demonstrates the relationship between type of institution, their emissions, and their rates of growth and use of carbon-offset credits in the process of a multi-generational program of institutional change. These relationships will, examined at the beginning of the implementation of the Climate Commitment program planning, become important factors in the ultimate success or failure of participating institutions ability to meet their commitments. This emissions mitigation effort is the most dramatic and well documented effort to date. Its results will create models for the type of institutions participating in this and similar programs. It is also hoped that critical analysis and comparisons of these strata both here and in other research will create needed feedback for ongoing institutional carbon mitigation planning efforts. Ultimately, this study will combine with longitudinal efforts to evaluate and compare results of efforts; will result in a road map to successful carbon mitigation planning.

An analysis of economic expectations in PCOCs will help reveal whether budgeting plays a role in the use of credits. The use of close reading and critical analysis has revealed a wide range of expectations of the cost of PCOCs. A future study will examine how the cost of credits and cost of other mitigation efforts affects the implementation of those strategies. Initial analysis indicates a wide range of expectations and expected roles for carbon offset credits, purchased and generated by campus programs either for institution use in offsetting other sources of emissions or to be sold. An analysis of the expected cost of PCOCs versus of the sale of PCOCs to fund other mitigation strategies represents a central question of the use of these offsets, whether colleges and universities will be net consumers of such credits or net producers. It is possible that a divide exists between institutions with large land holdings and rural locations, and urban and commuter campuses. Campus setting will be an important factor in future studies.

The use of PCOCs is expected to play a role in reaching the goal of elimination of carbon emissions from operations at American colleges and universities participating in the Climate Commitment. The degree of those expectations varies between factors of ownership and enrollment levels with private ownership and large enrollments in public institutions being indicative of the use of PCOCs.

The ultimate effectiveness of the use of PCOCs from mitigation and cost effectiveness perspectives will depend on a number of factors that will develop in the coming decades. The expectations examined in this research will play a role in how those markets develop and are utilized by these and other institutions.

A market trading in carbon emissions will almost certainly play a key factor in the process of controlling carbon emissions. Colleges and universities, being at the fore of carbon emissions mitigation efforts, will be central to the development and legitimization of these markets by their planned use and ultimate participation as the markets develop. Leading the way forward for other groups such as businesses or municipalities confers a responsibility upon these institutions of higher education to make informed and consistent choices in their use of carbon credits.

Discussion of the Content Analysis

The content analysis section of the research utilized the rich data source of the Climate Commitment plans in ways that went beyond the standard reported data. The plans were required to provide not just data but also the description and narrative of the institution setting out on a half-century duration project. The hypothesis of this research that over the course of that long period as technologies and individuals change, the narrative of the institution will take on a greater importance. The main findings of the content analysis is that while some type of descriptive or evocative narrative is almost used, the only type of language that is dependent on the divisions between the strata (ownership, majority of degrees awarded, and enrollment) is the presence of ethical language. More generally, the presence of any language is dependent on the type of institution but not on a single descriptive factor.

The content analysis method was limited in the categories and quantity of phraseology that could be examined. With greater resources a more robust and repeatable methodology for examining the plans could be developed. A limitation of the close reading methodology utilized in the content analysis is that it depended upon a single reader and evaluator using individual judgment to identify types of phrases. This

severely limits the scope of this type of study to the quantity of material a single individual can review since adding additional reviewers would introduce inconsistencies in judgment. A sufficiently large sample size was possible in this study so that specific limitation was not a factor but would be for larger projects. Repeatability can be difficult as well when individual judgment is a major factor. The review sheet for each plan included detailed quotes and locations for each of the identified phrases and could be used in any attempt to replicate the research. (Appendices G, H, I, and J) Examination of larger scale data could be accomplished with a group of evaluators trained in producing consistent results, by using statistical methods to cross check different examiners by using samples reviewed by each, or by utilizing data mining techniques to allow for computer analysis of narrative content. Developing an explicit ethical position for an institution and expressing that in the process of explaining sustainability initiatives can have an impact on how planning takes place.

The presence of language of any kind as dependent factor is reflected in the normative number of recorded phrases per page recorded for each stratum. (Figure 4-6) The 2-year public strata having the least amount, followed by the 4-year public small, and 4-year public large all demonstrate that as size and type of degree awarded increases the institutions tended to use more descriptive language in their planning. This finding is reflective of the general quality of the plans and the sophistication of the planning employed in each of the stratum. The private strata continued the trend of more hedging language than the 4-year public large strata but saw a decrease in the amount of imperative language. This cautionary approach may be the result of a private institutions both having less intrinsic motivation in sustainability matters owning to not

being public entities and in having a reticence to make speculative planning commitments.

The results of the content analysis confirm the hypothesis that the presence of certain types of language has a demonstrable relationship to the type of institution doing the planning and that the factors dividing the strata were meaningful distinctions between institutions.

Research Questions

The impact of structural factors is demonstrated in the results of the numerical and content analysis sections. Private institutions tend to hedge their planning to a greater degree than others. Offsets are relied upon at a greater rate as enrollment increases. 2-year institutions tended to have the least amount of narrative detail in their plans and the larger enrollment in 4-year public institutions tended to correlate with increased details and fuller data provided in the plans.

The use of carbon offsets represented several different strategies in the plans. In some cases they were used to offset only specific types of emissions sources, specifically air travel. Other cases they were used as a 'last-resort' employed at the conclusion of the program duration to mitigate any remaining emissions after all other efforts were implemented. Some cases utilized them as part of a mix of mitigation programs throughout the Climate Commitment duration implementing as soon as immediately. In a few cases the institutions planed to go beyond carbon neutrality and implement institutional resources in the generation, either for sale or for offset of other sources, their own carbon credits.

There were no clear trends in the use of specific types of motivational or ethical language, just that its presence was dependent on the structural factors of the strata.

Both hedging and imperative language occurred at varying rates that showed no dependence on structural factors, but when all the recorded types of language were included there was a strong dependence in the presence of it and the structural factors that characterized the strata. While there was explicit motivational and ethical language used at a low rate amongst the plans, there was no consistent or particularly strong approach to the types of understanding expressed by the language. Some institutions were motivated by some things, others by others ranging from legislative initiative, grass-roots efforts of students, a research initiative by faculty, or institutional leadership wishing to participate in the program. Intrinsic motivation or a geocentric worldview were not noted, the ethical motivation was nearly always an anthropocentric one based on the intergenerational justice mantra of sustainability.

Future Research

The content analysis findings may prove to be the most interesting of the findings as the longitudinal research covering the implementation of the plans occurs. The current findings, relating the types of language used to the type of institution, will be relatable to the success or failure of the implementation of the plans over time. Future research will be able to determine factors of institutions that were positively associated with successful results and then see how the use of narrative language relates to those factors. There may be a dependent relationship between those institutions that express ethical and motivational language now and their success in their mitigation efforts over the duration of the program. The content analysis and narrative examination performed in this research will lay the groundwork for these future studies and perhaps broader research into the institutional narrative of sustainability and climate change. In the same way individuals see themselves as playing a role and having an impact on a host of

sustainability issues, institutions do as well. It is beyond the scope of this research to speculate on the origin of that motivation and the nature of the relationship between institutions and factors of sustainability, but it is clear that one exists. The ‘speech’ of the institution, expressed in plans, documents, and other expressions of the institution do express a particular viewpoint, even when authorship is either unknown, diverse, or is attributed to a range of individuals. An institutional culture, defined by examination of narrative documents, and expressed in the success or failure of institutional planning efforts will be a pivotal factor in whether these dramatic and difficult commitments are kept.

Future studies could adopt similar methodologies but examine different strata divisions, such as enrollment, geographic location, endowment, political identification, majority of majors, or other factors. The findings that the chosen factors (ownership, enrollment, majority types of degrees awarded) were meaningful could be combined with a more extensive study including many more factors and develop a model of institutional identification that could express the ethical or other motivational factors expressed by differing types of institutions. The major source of emissions was consistently purchased electricity, thus the local generation sources were the largest determinate in intensity of emissions per unit of energy used. In some cases a college or university represents a large enough customer or is politically influential enough to alter the source of municipal power generation. Exerting pressure in that way would be an effective way to mitigate emissions and is a strategy employed by several of the participants. Transitioning to on site generation in the form of renewable energy sources is a consistent and effective strategy employed by many of the mid-sized institutions but

is sometimes described by the largest as impractical at their scale of operation. A focused study of the power generation sources utilized by colleges and universities would provide a greater insight into this central source of emissions and would provide strong framework for examining power generation sources as large parts of the emissions from operations model in studying other institutions. A study of that sort would require new methods but would be straight forward in its execution and require a great deal of original data collection and management. An immediate problem with that study and all studies looking at carbon emissions is the reliability of the methodology of determining those emissions. This study concedes that while some inaccuracy probably exists in the reported emissions, the emissions reported are likely precise providing a strong basis of direct comparison. Examining emissions measurement and reporting accuracy and reliability is itself a rich field of research and is not the focus of this project or other future research programs that are more interested in what is done in comparative analysis with that admittedly often unreliable data.

The combination of numerical and categorical data and the use of content analysis in this study has been a new approach that can now be utilized in examining other institutions. A project to examine and compare carbon mitigation planning at the Russell Group universities (top 20 research institutions of the United Kingdom) and comparable US institutions is being planned and the potential to include Canadian and Australian institutions as well as they are all embarking on similar carbon mitigation programs with different goals and baselines. Normalizing those baseline emissions, the measurement methodologies used, and the goals of their programs is the challenge but the basic methodological framework used in this study is adaptable to all those factors.

The ultimate goal is a longitudinal program of study of the implementation of the Climate Commitment program over its duration with a final product including a narrative of the process of planning and implementing this dramatic and transformative program, and a complete view of the planning process as it applied to sustainability, carbon emissions, and colleges and universities.

Studies will be required to track emissions reporting and integrate the analysis of that data into this study. Each cycle of reporting and analysis will result in model institutions featuring factors of ownership, enrollment, efforts undertaken, and use of PCOCs. This study will be capable of informing planning efforts as well as providing the basis to examine why certain factors lead to success and others have lesser effects. Factors to be included range from ethical and social factors of the planners or institutions, to budgeting and utilized mitigation efforts such as increased use of building technology or different types of carbon credit use.

This research has helped lay the ground work for additional studies examining these factors from economic, social, and other perspectives as part of these planning efforts. In addition, this research is essential and provides a basis for longitudinal studies as the described planning efforts are implemented and the results reported.

The most significant limitation of the content analysis portion of the study was the small amount of available data. The labor-intensive process of reviewing the plans in the depth required finding the individual phrases and the sparseness of the language found reduces the strength of the completed analysis. The Pearson's chi-squared method was successful in identifying ethical language and all language as the two dependent relationships in the tests. This indicates future research should focus on the

presence of ethical language as a variable when evaluating carbon emissions mitigation results and could be put further as a recommendation to those working on sustainability planning.

Conclusion

This research has examined the planning efforts made as part of the American Association of College and University Presidents' Climate Commitment. The Climate Commitment program has initiated efforts at signatory institutions to eliminate carbon emissions from operations by a set future date. The data for this research has consisted of the numerical reported emissions, mitigation methods, and structural data of each institution; and a sample of plans examined for certain narrative content. The methods employed sought to define and differentiate the participating institutions based on certain structural factors, to examine closely a particular mitigation method employed, and to create means to compare the strata using their narrative content.

The numerical examination of the data was aided by the manageable population size of just a few hundred participating institutions with even fewer providing the minimum data required by this study. Having the entire population to examine and describe helps to mitigate the fog of statistics that can cloud or complicate analysis. The findings that the use of PCOCs is expected in such a range of institutions and is relied upon to such a varying degree demonstrate the importance carbon markets will play in any sort of carbon emissions mitigation program. How those markets develop, the pricing of credits, and the ability of institutions to generate their own credits, discounting a major disruptive technology, are the least known factor in the planning taking place. Part of what made this research possible, and will be a major factor in comparative studies of other institutions, was the consistency of the available data both in its

formatting, use of units, and its collection methodology. There is every reason to believe there is a high level of precision and comparability in the reported emissions data, if not in the estimates for mitigation provided.

Content analysis as method of planning evaluation has demonstrated itself to be useful in producing categorical data but the problems of analysis of categorical and numerical data have limited the applicability of the statistical sample of the strata available for content analysis versus the entire population for which accurate information is available for numerical analysis. A more robust content analysis research program could address the problems associated with the methods described above and produce a broadly applicable and scalable research methodology that could provide substantial insights into sustainability planning and the thinking of institutions.

There remains a great deal of work to be done in integrating content analysis and other categorical methods with the numerical and structural aspects of institutions (both the ones utilized in this research and the other possibilities listed above) with the end goal of developing a complete and function model of the participating institutions, with reporting data on the success or failure of different implemented mitigation efforts, the model could be used to predict the long term success or failure of institutions based on their structural factors and their planned efforts. Those projections could help steer the efforts of institutions seeking to mitigate their emissions and ultimately increase the likelihood of success in the important endeavor of emissions mitigation.

Sustainability is still a new thing and coalescing field of study and a burgeoning professional practice. The ambitious planning that is taking place in the Climate Commitment and programs like it is essential to nothing less than the long-term

continuance of life and human society on Earth. For these and other reasons the plans that make up this study and the thinking of the participating institutions is still broad, wide, and deep in its considerations and products. Some of the plans are credible, focused, and reasonable documents providing guidance, evaluation, and process for achieving difficult ends; others less so. The best that can be said about the planning taking place is that with few exceptions it has clearly been done with a good intention and an intrinsic motive. The implications and impacts of the implementation of the plans over the next half century will provide a ripe region of study for those looking at measurement, planning, implementation, motivations, success, and failures, and ultimately as verdant ground for the future historians of sustainability.

APPENDIX A
SAMPLE INSTITUTIONAL DATA SET INSTRUMENT

Institution	Carnegie Enrollment	Ownership	Majority of Degrees	Plan?	AACUP Enrollment	Baseline emissions	BAU Emissions at end date	Expected Growth in Emissions	Quantity of off-sets to reach goal at end date	Percent of emissions mitigated by off-sets	Emissions per student
Union College	2200	Private	4-year	Yes	2116	21500	28000	30.23%	0	0.00%	10.16
Kalamazoo College	1200	Private	4-year	Yes	1353	13500	250000	1751.85%	0	0.00%	9.98
Wesleyan College	700	Private	4-year	Yes	506	7000	17000	142.86%	0	0.00%	13.83
Gettysburg College	2500	Private	4-year	Yes	2439	19000	16000	-15.79%	19500	121.88%	7.79
Dickinson College	2300	Private	4-year	Yes	2377	15500	17500	12.90%	5000	28.57%	6.52
George Washington University	24100	Private	4-year	Yes	20171	128000	145000	13.28%	25000	17.24%	6.35
Furman University	3400	Private	4-year	Yes	2688	34000	36000	5.88%	4000	11.11%	12.65
Duke University	12800	Private	4-year	Yes	13681	426000	426500	0.12%	50000	11.72%	31.14
Bentley University	5600	Private	4-year	Yes	5012	22000	24000	9.09%	10000	41.67%	4.39
Clark University	3100	Private	4-year	Yes	3230	20500	26500	29.27%	6000	22.64%	6.35
Emerson College	4400	Private	4-year	Yes	3595	9000	18000	100.00%	6500	36.11%	2.50
Bucknell University	3600	Private	4-year	Yes	3603	40500	46000	13.58%	0	0.00%	11.24
College of the Holy Cross	2700	Private	4-year	Yes	2898	23000	27500	19.57%	0	0.00%	7.94
Antioch University New England	900	Private	4-year	Yes	811	2500	2700	8.00%	0	0.00%	3.08
University of Pennsylvania	23300	Private	4-year	Yes	24599	250500	600000	139.52%	0	0.00%	10.18
Ithaca College	6300	Private	4-year	Yes	6780	32500	50000	53.85%	28000	56.00%	4.79
Loyola Marymount University	8800	Private	4-year	Yes	7311	32500	39000	20.00%	0	0.00%	4.45
Macalester College	1900	Private	4-year	Yes	1872	26500	28000	5.66%	10000	35.71%	14.16
Syracuse University	18200	Private	4-year	Yes	17577	113000	130000	15.04%	65000	50.00%	6.43
Bowdoin College	1700	Private	4-year	Yes	1750	17000	28000	64.71%	0	0.00%	9.71
Colby College	1800	Private	4-year	Yes	1847	17500	39000	122.86%	11000	28.21%	9.47

APPENDIX B
CONTENT ANALYSIS DATA INSTRUMENT

Table B-1. Data Instrument form used to record content analysis.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name				
Ownership				
Enrollment				
Majority of Degrees				
Date of neutrality				
Plan length (pages)				
Quantitative Emissions				
Total Emissions Reported				
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year		
Expected portion of total in off-sets at end date		Milestone 1		
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases:		Ethical Language?		
Imperative Phrase	Page number			
Number of Hedging phrases:		Motivational Language?		
Hedging Phrase	Page number			
Plan Authors	Notes:			

APPENDIX C
2-YEAR STRATUM NUMERICAL DATA

Table C-1. 2-year stratum population numerical data.

Institution	Carnegie Enrollment	Ownership	Majority of Degrees	Plan?	AACUP Enrollment	Baseline emissions	BAU Emissions at end date	Expected Growth in Emissions	Quantity of off-sets to reach goal at end date	Percent of emissions mitigated by off-sets	Emissions per Student
Wilson Community College	2100	Public	2-year	Yes	10171	30500	29000	-4.92%	0	0.00%	3.00
Finger Lakes Community College	4900	Public	2-year	Yes	1612	8000	11800	47.50%	6300	53.39%	4.96
Broome Community College	6600	Public	2-year	Yes	6275	20500	20500	0.00%	0	0.00%	3.27
Kankakee Community College	3500	Public	2-year	Yes	2728	12500	12500	0.00%	0	0.00%	4.58
Quinsigamond Community College	5800	Public	2-year	Yes	9524	10000	13500	35.00%	0	0.00%	1.05
Victor Valley College	9300	Public	2-year	Yes	9049	32000	72000	125.00%	0	0.00%	3.54
Vermilion Community College	800	Public	2-year	Yes	646	3000	5000	66.67%	0	0.00%	4.64
Columbus State Community College	22000	Public	2-year	Yes	23158	63500	63500	0.00%	0	0.00%	2.74
Mean					7895.375	22500	28475	33.66%	787.5	6.67%	3.47

APPENDIX D
4-YEAR PUBLIC SMALL STRATUM NUMERICAL DATA

Table D-1. 4-year public small stratum population numerical data.

Institution	Carnegie Enrollment	Ownership	Majority of Degrees	Plan?	AACUP Enrollment	Baseline emissions	BAU Emissions at end date	Expected Growth in Emissions	Quantity of off-sets to reach goal at end date	Percent of emissions mitigated by off-sets	Emissions per student
Oregon State University	19100	Public	4-year	Yes	18432	150000	197000	31.33%	98000	49.75%	8.14
Eastern Washington University	10700	Public	4-year	Yes	9225	50000	60000	20.00%	16000	26.67%	5.42
University of Colorado at Colorado Springs	9000	Public	4-year	Yes	7638	29000	60000	106.90%	0	0.00%	3.80
James Madison University	16100	Public	4-year	Yes	17339	77500	115000	48.39%	80000	69.57%	4.47
University of Maine	11400	Public	4-year	Yes	11867	71000	117000	64.79%	0	0.00%	5.98
Minneapolis Community and Technical College	7100	Public	4-year	Yes	12766	25000	30000	20.00%	6000	20.00%	1.96
University of Wyoming	13200	Public	4-year	Yes	11032	134000	210000	56.72%	0	0.00%	12.15
Central Connecticut State University	12300	Public	4-year	Yes	9857	49000	60000	22.45%	0	0.00%	4.97
Utah State University	16100	Public	4-year	Yes	21226	133000	200000	50.38%	0	0.00%	6.27
State University of New York College of Environmental Science and Forestry	2000	Public	4-year	Yes	1945	11000	13000	18.18%	0	0.00%	5.66
California State Polytechnic University-Pomona	19000	Public	4-year	Yes	18757	64000	61000	-4.69%	0	0.00%	3.41
Oregon Institute of Technology	3400	Public	4-year	Yes	2588	10000	55000	450.00%	45000	81.82%	3.86
Southern Connecticut State University	12200	Public	4-year	Yes	9199	24500	25000	2.04%	0	0.00%	2.66
Rowan University	9700	Public	4-year	Yes	10091	59000	154500	161.86%	2000	1.29%	5.85
Towson University	17700	Public	4-year	Yes	18860	113000	155000	37.17%	0	0.00%	5.99
University of Maryland Baltimore County	11900	Public	4-year	Yes	11263	88500	105000	18.64%	0	0.00%	7.86
State University of New York College at Oswego	8300	Public	4-year	Yes	8300	31000	48000	54.84%	0	0.00%	3.73
Southern Oregon University	5200	Public	4-year	Yes	3934	6000	35000	483.33%	0	0.00%	1.53
Kennesaw State University	18000	Public	4-year	Yes	22389	96000	168000	75.00%	90000	53.57%	4.29
Western State College of Colorado	2300	Public	4-year	Yes	2185	11000	32500	195.45%	0	0.00%	5.03
University of Arkansas Main Campus	17300	Public	4-year	Yes	14215	158500	260000	64.04%	0	0.00%	11.15
University of Southern Mississippi	15300	Public	4-year	Yes	12482	114500	180000	57.21%	0	0.00%	9.17
Salem State College	9300	Public	4-year	Yes	8303	24000	60000	150.00%	0	0.00%	2.89
University of Maine at Farmington	2300	Public	4-year	Yes	1954	11500	12000	4.35%	4000	33.33%	5.89
Georgia Institute of Technology	16900	Public	4-year	Yes	20291	325000	340000	4.62%	0	0.00%	16.02
University of North Dakota	13200	Public	4-year	Yes	10845	138500	240000	73.29%	0	0.00%	12.77
University of Rhode Island	14800	Public	4-year	Yes	13234	95500	130000	36.13%	0	0.00%	7.22
University of Colorado Denver	19800	Public	4-year	Yes	18984	164500	240000	45.90%	0	0.00%	8.67
South Dakota School of Mines and Technology	2300	Public	4-year	Yes	1734	25000	390000	1460.00%	0	0.00%	14.42
California State University-Chico	15700	Public	4-year	Yes	15712	36000	49500	37.50%	0	0.00%	2.29
State University of New York College at Geneseo	5600	Public	4-year	Yes	5451	23500	310000	1219.15%	0	0.00%	4.31
University of Maine at Augusta	5500	Public	4-year	Yes	5816	8000	9500	18.75%	0	0.00%	1.38
University of Southern Maine	11100	Public	4-year	Yes	10500	22500	22500	0.00%	3700	16.44%	2.14
Salisbury University	7000	Public	4-year	Yes	7747	26500	45000	69.81%	6000	13.33%	3.42
Plymouth State University	5200	Public	4-year	Yes	5258	17000	26000	52.94%	0	0.00%	3.23
Mean					10897.69	69228.6	120442.8571	148.76%	10020	10.45%	5.94

APPENDIX E
4-YEAR PUBLIC LARGE STRATUM NUMERICAL DATA

Table E-1. 4-year public large stratum population numerical data.

Institution	Carnegie Enrollment	Ownership	Majority of Degrees	Plan?	AACUP Enrollment	Baseline emissions	BAU Emissions at end date	Expected Growth in Emissions	Quantity of off-sets to reach goal at end date	Percent of emissions mitigated by off-sets	Emissions per student
University of Utah	29000	Public	4-year	Yes	29000	271341	789909	191.11%	30000	3.80%	9.36
George Mason University	28900	Public	4-year	Yes	28900	101991	150000	47.07%	130000	86.67%	3.53
Grand Valley State University	22100	Public	4-year	Yes	22100	85355	74331	-12.92%	9000	12.11%	3.86
University of California, Santa Barbara	21000	Public	4-year	Yes	21000	58671	110000	87.49%	33000	30.00%	2.79
University of California, Irvine	24300	Public	4-year	Yes	27400	156761	265000	69.05%	0	0.00%	5.72
University of South Florida	42200	Public	4-year	Yes	39400	257566	50000	-80.59%	50000	100.00%	6.54
University of Illinois at Chicago	24900	Public	4-year	Yes	24600	270682	300000	10.83%	40000	13.33%	11.00
Arizona State University	49200	Public	4-year	Yes	64400	293248	620000	111.43%	70000	11.29%	4.55
Colorado State University	28000	Public	4-year	Yes	25000	230607	260000	12.75%	0	0.00%	9.22
University of Colorado at Boulder	32400	Public	4-year	Yes	30000	178912	240000	34.14%	20000	8.33%	5.96
University of Tennessee, Knoxville	27800	Public	4-year	Yes	26800	258197	459000	77.77%	313333	68.26%	9.63
University of Washington Seattle	39200	Public	4-year	Yes	41300	164350	275000	67.33%	75000	27.27%	3.98
State University of New York at Buffalo	27300	Public	4-year	Yes	28000	151928	218980	44.13%	52445	23.95%	5.43
University of Florida	48000	Public	4-year	Yes	47200	432123	500000	15.71%	240000	48.00%	9.16
University of Illinois at Urbana-Champaign	40700	Public	4-year	Yes	42102	522757	1040000	98.95%	170000	16.35%	12.42
University of Maryland College Park	35000	Public	4-year	Yes	34400	284950	315000	10.55%	8000	2.54%	8.28
University of California, San Diego	24700	Public	4-year	Yes	28500	293853	450000	53.14%	200000	44.44%	10.31
University of Delaware	21200	Public	4-year	Yes	17600	152542	165000	8.17%	0	0.00%	8.67
State University of New York at Stony Brook	21700	Public	4-year	Yes	22000	322577	0	-100.00%	0	0.00%	14.66
Virginia Commonwealth University	28300	Public	4-year	Yes	27900	129774	170000	31.00%	120000	70.59%	4.65
University of North Carolina at Chapel Hill	26900	Public	4-year	Yes	26400	569169	880000	54.61%	400000	45.45%	21.56
Mean					31142.952	247016.9	349153.3333	39.60%	93370.38095	29.16%	8.156710788

APPENDIX F
4-YEAR PRIVATE STRATUM NUMERICAL DATA

Table F-1. 4-year private stratum population numerical data.

Institution	Carnegie Enrollment	Ownership	Majority of Degrees	Plan?	AACUP Enrollment	Baseline emissions	BAU Emissions at end date	Expected Growth in Emissions	Quantity of off-sets to reach goal at end date	Percent of emissions mitigated by off-sets	Emissions per student
Union College	2200	Private	4-year	Yes	2116	21500	28000	30.23%	0	0.00%	10.16
Kalamazoo College	1200	Private	4-year	Yes	1353	13500	250000	1751.85%	0	0.00%	9.98
Wesleyan College	700	Private	4-year	Yes	506	7000	17000	142.86%	0	0.00%	13.83
Gettysburg College	2500	Private	4-year	Yes	2439	19000	16000	-15.79%	19500	121.88%	7.79
Dickinson College	2300	Private	4-year	Yes	2377	15500	17500	12.90%	5000	28.57%	6.52
George Washington University	24100	Private	4-year	Yes	20171	128000	145000	13.28%	25000	17.24%	6.35
Furman University	3400	Private	4-year	Yes	2688	34000	36000	5.88%	4000	11.11%	12.65
Duke University	12800	Private	4-year	Yes	13681	426000	426500	0.12%	50000	11.72%	31.14
Bentley University	5600	Private	4-year	Yes	5012	22000	24000	9.09%	10000	41.67%	4.39
Clark University	3100	Private	4-year	Yes	3230	20500	26500	29.27%	6000	22.64%	6.35
Emerson College	4400	Private	4-year	Yes	3595	9000	18000	100.00%	6500	36.11%	2.50
Bucknell University	3600	Private	4-year	Yes	3603	40500	46000	13.58%	0	0.00%	11.24
College of the Holy Cross	2700	Private	4-year	Yes	2898	23000	27500	19.57%	0	0.00%	7.94
Antioch University New England	900	Private	4-year	Yes	811	2500	2700	8.00%	0	0.00%	3.08
University of Pennsylvania	23300	Private	4-year	Yes	24599	250500	600000	139.52%	0	0.00%	10.18
Ithaca College	6300	Private	4-year	Yes	6780	32500	50000	53.85%	28000	56.00%	4.79
Loyola Marymount University	8800	Private	4-year	Yes	7311	32500	39000	20.00%	0	0.00%	4.45
Macalester College	1900	Private	4-year	Yes	1872	26500	28000	5.66%	10000	35.71%	14.16
Syracuse University	18200	Private	4-year	Yes	17577	113000	130000	15.04%	65000	50.00%	6.43
Bowdoin College	1700	Private	4-year	Yes	1750	17000	28000	64.71%	0	0.00%	9.71
Colby College	1800	Private	4-year	Yes	1847	17500	39000	122.86%	11000	28.21%	9.47
Davidson College	1700	Private	4-year	Yes	1743	23500	35000	48.94%	0	0.00%	13.48
Centre College	1100	Private	4-year	Yes	1186	17000	29000	70.59%	0	0.00%	14.33
University of Mount Union	2200	Private	4-year	Yes	2190	17000	17000	0.00%	4000	23.53%	7.76
Northland College	700	Private	4-year	Yes	559	4000	5000	25.00%	0	0.00%	7.16
Cornell University	19500	Private	4-year	Yes	20600	308000	600000	94.81%	100000	16.67%	14.95
Monterey Institute of International Studies	800	Private	4-year	Yes	860	3500	4000	14.29%	0	0.00%	4.07
Point Loma Nazarene University	3200	Private	4-year	Yes	2300	6000	27500	358.33%	0	0.00%	2.61
Bates College	1700	Private	4-year	Yes	1660	9500	25000	163.16%	2500	10.00%	5.72
Santa Clara University	7900	Private	4-year	Yes	7807	15500	18000	16.13%	0	0.00%	1.99
Saint Peter's College	3200	Private	4-year	Yes	3000	12000	27500	129.17%	0	0.00%	4.00
Hobart and William Smith Colleges	1800	Private	4-year	Yes	2034	15500	760000	4803.23%	100000	13.16%	7.62
Wesley College	2000	Private	4-year	Yes	1530	8500	16000	88.24%	0	0.00%	5.56
Westminster College-Utah	2400	Private	4-year	Yes	2781	11500	15000	30.43%	0	0.00%	4.14
Linfield College	1700	Private	4-year	Yes	1713	8000	8000	0.00%	500	6.25%	4.67
Smith College	3200	Private	4-year	Yes	2571	30500	30000	-1.64%	8000	26.67%	11.86
Allegheny College	2000	Private	4-year	Yes	2080	17500	20500	17.14%	6000	29.27%	8.41
Bard College	2000	Private	4-year	Yes	1927	14500	15500	6.90%	0	0.00%	7.52
Hamilton College	1800	Private	4-year	Yes	1834	22500	35000	55.56%	0	0.00%	12.27
Mean					4733.1026	46564.1	94428.2051	216.99%	11820.513	15.04%	8.493212212

APPENDIX G
2-YEAR CONTENT ANALYSIS STRATUM DATA

Table G-1. Delta College content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Delta College	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	7123			
Majority of Degrees	2-Year			
Date of neutrality				
Plan length (pages)	63			
Quantitative Emissions				
Total Emissions Reported	25000			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year		
Expected portion of total in off-sets at end date		Milestone 1		
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases:		Ethical Language?		
Imperative Phrase	Page number			
		"doing the right thing for future generations" p3, "sound environmental practices... the right thing to do" p9, "responsibility to consider, develop, and implement [green] processes throughout..." p55		
Number of Hedging phrases:		Motivational Language?		
Hedging Phrase	Page number			
Plan Authors	Notes: Good ethical language with regard to the institution but nothing much in the way of describing action or commitment to the goals of the			

Table G-2. Northern Essex Community College content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Northern Essex Community College	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	3922			
Majority of Degrees	2-Year			
Date of neutrality	2040			
Plan length (pages)	9			
Quantitative Emissions				
Total Emissions Reported	10500			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2008	
Expected portion of total in off-sets at end date		Milestone 1		
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases:		Ethical Language?		
Imperative Phrase	Page number			
Number of Hedging phrases:		Motivational Language?		
Hedging Phrase	Page number			
Plan Authors	Notes: Besides base year and date of neutrality, nothing substantial as far as achieving the goal or describing the institution's relationship to th			

Table G-3. Chabot College content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Chabot College	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	10533			
Majority of Degrees	2-Year			
Date of neutrality	2050			
Plan length (pages)	45			
Quantitative Emissions				
Total Emissions Reported	18000			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2008	
Expected portion of total in off-sets at end date		Milestone 1	2020	15.00%
Quantity of emissions mitigated including off sets		Milestone 2	2050	neutral
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
Annual plan updates				
Content Analysis				
Number of Imperative phrases:		Ethical Language?		
Imperative Phrase	Page number			
Number of Hedging phrases:		Motivational Language?		
Hedging Phrase	Page number			
Plan Authors	Notes: Nothing, decriptions of efforts, but no justification or explanation, or plan to get anywhere.			

Table G-4. Onondaga Community College content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Onondaga Community College	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	3128			
Majority of Degrees	2-Year			
Date of neutrality				
Plan length (pages)	13			
Quantitative Emissions				
Total Emissions Reported	15500			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2006	
Expected portion of total in off-sets at end date		Milestone 1		
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
Updates will be made each year, p5				
Content Analysis				
Number of Imperative phrases:		1	Ethical Language?	
Imperative Phrase	Page number			
"This must be measured against the growing body of eviden	3			
Number of Hedging phrases:		1	Motivational Language?	
Hedging Phrase	Page number			
"affected by external variables ..."	3			
			p2 recognition of scale of problem of emissions, p6 "achieve the cultural change necessary to support the efforts..." good indication of scope/scale	
Plan Authors	Notes: Generally good plan when it comes to recognition of the problem and understanding the scale of it, but, short on implementation details			

Table G-5. Madison Area Technical College content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Madison Area Technical College	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	10829			
Majority of Degrees	2-Year			
Date of neutrality				
Plan length (pages)	24			
Quantitative Emissions				
Total Emissions Reported	25500			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year		
Expected portion of total in off-sets at end date		Milestone 1		
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases:		Ethical Language?		
Imperative Phrase	Page number			
Number of Hedging phrases:		Motivational Language?		
Hedging Phrase	Page number			

Plan Authors

Notes:
Nothing to report at all, really just a history of the school, the fact that they are signed on to the CC, and lists of energy data

Table G-6. Cabrillo College content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Cabrillo College	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	11610			
Majority of Degrees	2-Year			
Date of neutrality	Will not achieve neutrality			
Plan length (pages)	18			
Quantitative Emissions				
Total Emissions Reported	9000			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2008	
Expected portion of total in off-sets at end date		Milestone 1	2020	15.00%
Quantity of emissions mitigated including off sets		Milestone 2	2050	80.00%
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases		Ethical Language?		
Imperative Phrase	Page number			
Number of Hedging phrases		Motivational Language?		
Hedging Phrase	Page number			
Plan Authors	Notes: The 'big hedge', no plan for neutrality, the program goals are stated but then their school plans are stated to only reach 80% No ethical or motivational language This plan follows the same pattern as many of these other plans: state their President has signed the commitment, state what the CC is			

Table G-7. University of South Carolina Sumter content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	University of South Carolina Sumter	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	722			
Majority of Degrees	2-Year			
Date of neutrality				
Plan length (pages)	10			
Quantitative Emissions				
Total Emissions Reported	2000			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2007	
Expected portion of total in off-sets at end date		Milestone 1	2015	10.00%
Quantity of emissions mitigated including off sets		Milestone 2	2020	20.00%
Quantity of emissions mitigated not including off sets		Milestone 3	2030	30.00%
How has growth been accounted for?		Milestone 4		
Growth assumed but not accounted for				
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases:	1	Ethical Language?		
Imperative Phrase	Page number			
"Colleges and universities must exercise leadership..."	1			
Number of Hedging phrases:	1	Motivational Language?		
Hedging Phrase	Page number			
"As time and funding allow"	1			
Plan Authors	Notes:			
	Not much substance, just a lot of boilerplate about 'stakeholders' and 'should' this or that, strangely a fair bit of talk about stakeholder "p			

APPENDIX H
4-YEAR PUBLIC SMALL CONTENT ANALYSIS STRATUM DATA

Table H-1. University of Idaho content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	University of Idaho	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	10775			
Majority of Degrees	4-Year			
Date of neutrality	2030			
Plan length (pages)	26			
Quantitative Emissions				
Total Emissions Reported	39500			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2009	
Expected portion of total in off-sets at end date		Milestone 1	2012	25.00%
Quantity of emissions mitigated including off sets		Milestone 2	2016	50.00%
Quantity of emissions mitigated not including off sets		Milestone 3	2023	80.00%
How has growth been accounted for?		Milestone 4	2030	100
What kind of feedback will be used to update the plan?				
"This report is intended to be a living document" p5; "every two years" p26				
Content Analysis				
Number of Imperative phrases		Ethical Language?		
Imperative Phrase	Page number	"it is up to our generation to initiate the social, economics, and environmental efforts needed", intergenerational justice ethic, p2;		
Number of Hedging phrases		Motivational Language?		
Hedging Phrase	Page number	"Us are uniquely positioned to advance research surrounding climate change..." p2; "If we take action now, we will have a greater chance to mitigate the impact of global climate change." p2		
Plan Authors	Notes: Interesting in-house offset credit investment plan, p10 Honest accounting of planning effort on p26			

Table H-2. Eastern Washington University content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Eastern Washington University	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	9225			
Majority of Degrees	4-Year			
Date of neutrality				
Plan length (pages)	13			
Quantitative Emissions				
Total Emissions Reported	50000			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year		
Expected portion of total in off-sets at end date		Milestone 1		
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
Planning on a 3% emissions increase to account for growth, p5				
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases:	2	Ethical Language?		
Imperative Phrase	Page number			
"obligation toward sustainability and emissions reduction"	2			
"prepared to move forward and make insitutional changes ne	2			
		"Eastern values center around the diea of quality..." p1		
Number of Hedging phrases:	1	Motivational Language?		
Hedging Phrase	Page number			
"can realistically be incorporated.."	1			
Plan Authors	Notes: Offsets used as needed Lots of weasel words about 'stakeholders' and whatnot, not much solid planning to live up to their self professed obligations			

Table H-3. University of Colorado at Colorado Springs content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	University of Colorado at Colorado Springs	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	7638			
Majority of Degrees	4-Year			
Date of neutrality				
Plan length (pages)	39			
Quantitative Emissions				
Total Emissions Reported	29000			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2006	
Expected portion of total in off-sets at end date		Milestone 1	2020	20.00%
Quantity of emissions mitigated including off sets		Milestone 2	2030	50.00%
Quantity of emissions mitigated not including off sets		Milestone 3	2050	80.00%
How has growth been accounted for?		Milestone 4		
1.85% building square footage growth and 3% enrollment growth expected, a few other details on growth, p11				
What kind of feedback will be used to update the plan?				
5-year update cycle, p3				
Content Analysis				
Number of Imperative phrases:	2	Ethical Language?		
Imperative Phrase	Page number			
"is committed to meeting its emissions reduction targets and	5			
"will reduce energy consumption, increase the use of renew	13			
Number of Hedging phrases:	6	Motivational Language?		
Hedging Phrase	Page number			
"altered as campus grows, funding is made available, and n	3			
"The financial challenges facing the university at present..."	5			
"UCCS is committed to reducing emissions... current and pr	5			
"has not yet developed a detailed account of the associated	19			
"would be prohibitively expensive, it is recommended that fu	20			
"limited in its ability to pursue solar as a viable way of reduc	24			
Plan Authors	Notes: Offsets to be used as last resort, p25			

Table H-4. William Paterson University of New Jersey content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	William Paterson University of New Jersey	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	8437			
Majority of Degrees	4-Year			
Date of neutrality	nope			
Plan length (pages)	27			
Quantitative Emissions				
Total Emissions Reported	42000			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2002	
Expected portion of total in off-sets at end date		Milestone 1	2008	30.00%
Quantity of emissions mitigated including off sets		Milestone 2	2028	50.00%
Quantity of emissions mitigated not including off sets		Milestone 3	2050	80.00%
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases:		Ethical Language?		
Imperative Phrase	Page number	"Out motivation comes from the adoption of Sustainability as our philosophy Sustainability marries environmental stewardship with solid business principles." novel interpretation, ExSum, p3		
Number of Hedging phrases:	2	Motivational Language?		
Hedging Phrase	Page number			
"that would require a heavy capital investment and extensive	6			
"The frequent turn-over of management in PPO made it unre	6			
Plan Authors	Notes: Confusing and poorly written Not planning for neutrality			

Table H-5. New College of Florida content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	New College of Florida	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	786			
Majority of Degrees	4-Year			
Date of neutrality				
Plan length (pages)	32			
Quantitative Emissions				
Total Emissions Reported	7000			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	"current"	
Expected portion of total in off-sets at end date		Milestone 1	2019/2020	25.00%
Quantity of emissions mitigated including off sets		Milestone 2	2022/2023	33.00%
Quantity of emissions mitigated not including off sets		Milestone 3	2029/2030	50.00%
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases:		Ethical Language?		
Imperative Phrase	Page number			
		Self-preservation ethic, p5		
Number of Hedging phrases:	5	Motivational Language?		
Hedging Phrase	Page number			
"the quest for carbon neutrality must be affordable"	6			
"produce a reasonable financial return on investment"	6			
"an alternative goal..."	6			
"it is not possible to project with any accuracy the date at wh	7			
"predictable barriers to the implementation of this plan exist.	29			
Plan Authors	Notes:			

Table H-6. James Madison University content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	James Madison University	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	17339			
Majority of Degrees	4-Year			
Date of neutrality				
Plan length (pages)	53			
Quantitative Emissions				
Total Emissions Reported	77500			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2005	
Expected portion of total in off-sets at end date		Milestone 1		
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
They are planning to grow emissions rather than reduce, p.iv.; details p29				
What kind of feedback will be used to update the plan?				
updates biannually				
Content Analysis				
Number of Imperative phrases:	6	Ethical Language?		
Imperative Phrase	Page number			
"All vehicles purchased must be biodiesel, electric or hybrid.	6			
"has committed to being a model steward of the natural wor	8			
"broader set of environmental priorities"	12			
"we have to change what and how we consume"	12			
"have and will bring about significant change."	14			
"...will be an environmentally literate community... stewards	45			
		A set of 'principles' vaguely ethical, p2; 'stewardship ethic,' p3, p4; anthropocentric and IGJ ethic also on p4		
Number of Hedging phrases:	4	Motivational Language?		
Hedging Phrase	Page number			
"... to strive toward climate neutrality."	iv			
"will establish a long-term plan for achieving carbon neutralit	19			
"implementation will be governed by priorities established th	41			
"... it appears technologically possible... emissions reduction	44			
		"[Sustainability] transforms how we live and therefore everything about us is redefined." p12		
Plan Authors	Notes: Some notes on the use of offsets, generating them for sale (?) and preference for local sellers, p39 Offset cost estimates, p41			

Table H-7. University of Minnesota-Morris content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	University of Minnesota-Morris	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	1607			
Majority of Degrees	4-Year			
Date of neutrality	2010			
Plan length (pages)	13			
Quantitative Emissions				
Total Emissions Reported	15000			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2009	
Expected portion of total in off-sets at end date		Milestone 1	2010	100.00%
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases:		Ethical Language?		
Imperative Phrase	Page number			
Number of Hedging phrases:		Motivational Language?		
Hedging Phrase	Page number			
Plan Authors	Notes: Very short plan outlining how they have achieved neutrality, namely through a pair of wind turbines and a biomass plant that collectively			

Table H-8. Northern Arizona University content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Northern Arizona University	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	22745			
Majority of Degrees	4-Year			
Date of neutrality	2020			
Plan length (pages)	39			
Quantitative Emissions				
Total Emissions Reported	79000			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year		
Expected portion of total in off-sets at end date		Milestone 1	2014	2000 levels
Quantity of emissions mitigated including off sets		Milestone 2	2018	1990 levels
Quantity of emissions mitigated not including off sets		Milestone 3	2020	neutrality
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
"... living document..." p6				
Content Analysis				
Number of Imperative phrases:	2	Ethical Language?		
Imperative Phrase	Page number	"The University will first develop a plan to create a culture that embraces conservation of energy and water." This statement describes a subjective view of ethics and an assertion that the university can actively alter moral sentiment.p7; "Environmental sustainability is a value that NAU has long endorsed in its mission and strategic planning..." "Current marketing initiatives emphasize this long-term commitment to environmental sustainability..." sus as 'value' and marketing tool, again, consciously subjective assertion about the moral character of the institution and its people. P8		
"we are committed to living, learning, researching, sustainab	5			
"taking immediate steps to reduce greenhouse gas emissior	6			
Number of Hedging phrases:	3	Motivational Language?		
Hedging Phrase	Page number	"As a higher education institution, we have the responsibility to lead society to significantly plan for and practice climate neutrality." p1		
"The climate action plan seeks to:"	2			
"After all current systems are addressed the university will se	7			
"The university administration will allocate funding for vehicle	34			
Plan Authors	Notes: unfocused and lacking specifics Some ethical language and a novel definition of sustainability Offsets to be used if needed, p7			

Table H-9. Oregon State University content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Oregon State University	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	18432			
Majority of Degrees	4-Year			
Date of neutrality	2025			
Plan length (pages)	44			
Quantitative Emissions				
Total Emissions Reported	150000			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	1990	
Expected portion of total in off-sets at end date		Milestone 1	2010	0.00%
Quantity of emissions mitigated including off sets		Milestone 2	2012	10.00%
Quantity of emissions mitigated not including off sets		Milestone 3	2020	75.00%
How has growth been accounted for?		Milestone 4	2025	100
What kind of feedback will be used to update the plan?				
Yearly updates to the plan, p43				
Content Analysis				
Number of Imperative phrases:	3	Ethical Language?		
Imperative Phrase	Page number			
"foster exceptional education and research and outreach ini	15			
"Imperative for Action" section 6.2 heading	18			
"on thing is certain: the longer organizations wait to act..."	23			
		"The economic benefit of building efficiency is as much a priority as the environmental benefit", p18 (environmental economic view)		
Number of Hedging phrases:	1	Motivational Language?		
Hedging Phrase	Page number			
"It should be noted that the emissions reported above are n	20			
Plan Authors	Notes:			

APPENDIX I
4-YEAR PUBLIC LARGE CONTENT ANALYSIS STRATUM DATA

Table I-1. University of Oklahoma Norman content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	University of Oklahoma Norman Campus	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	27500			
Majority of Degrees	4-Year			
Date of neutrality	2050			
Plan length (pages)	9			
Quantitative Emissions				
Total Emissions Reported	253789			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date	0	Baseline year		
Expected portion of total in off-sets at end date	0.00%	Milestone 1		
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases:	2	Ethical Language?		
Imperative Phrase	Page number			
is committed to'	cover			
solemnly assumes a leadership role in.. sustainability	cover			
		Yes, but vague, referring to the 'solemnly assume role' phrase on the cover		
Number of Hedging phrases:	0	Motivational Language?		
Hedging Phrase	Page number			

Plan Authors

Notes
Brief discussion of the use of offsets at the end of the plan, not totally clear what the intent is

Table I-2. University of Utah content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	University of Utah	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	29000			
Majority of Degrees	4-Year			
Date of neutrality				
Plan length (pages)	55			
Quantitative Emissions				
Total Emissions Reported	271341			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year		
Expected portion of total in off-sets at end date		Milestone 1		
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
P19, plan is a 5-year plan, experience and feedback as the plan is implemented will contribute to future planning efforts, good job articulating how this plan operates over time. P33, "humanity has a responsibility to reduce CO2" P51, plan will be constantly updated over time and a new plan written every 3 years.				
Content Analysis				
Number of Imperative phrases:	5	Ethical Language?		
Imperative Phrase	Page number			
"forced us to reassess"	4			
"bold, holistic, and creative vision that will address"	6			
"Desire, ability, and commitment"	7			
"must create knowledge to meet its goal of carbon neutrality	24			
"2050..U of Utah will not be dependent on the automobile"	34			
		P16, understanding of the deep nature of change required, quoting David Orr, good description of the type of change required to achieve goals. P20 "human interdependence" recognition of humans as part of physical reality, part of an ecosystem. P52, "responsibility toward environmental stewardship"		
Number of Hedging phrases:	1	Motivational Language?		
Hedging Phrase	Page number			
Each of these strategies is an abstract idea"	52			
Plan Authors	Notes			
Dozens from all over campus, community, alumni, financial l	Lots of use of 'will', which is neither hedging or imperative, but simply states an intent, therefore not included in either category.			

Table I-3. George Mason University content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	George Mason University	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	28900			
Majority of Degrees	4-Year			
Date of neutrality	2050 (80%) not planning for neutrality			
Plan length (pages)	19			
Quantitative Emissions				
Total Emissions Reported	101991			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date	80.00%	Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2006	
Expected portion of total in off-sets at end date		Milestone 1	2012	0.00%
Quantity of emissions mitigated including off sets		Milestone 2	2014	10.00%
Quantity of emissions mitigated not including off sets		Milestone 3	2020	50.00%
How has growth been accounted for?		Milestone 4	2050	80.00%
What kind of feedback will be used to update the plan?				

Content Analysis			
Number of Imperative phrases:	4	Ethical Language?	
Imperative Phrase	Page number		
"measurably advancing toward climate neutrality"	11		
"the only way... develop its own sources of renewable energ	16		
"radically transform Mason's ...operations... zeitgeist"	17		
"This project is imperative"	18		
Number of Hedging phrases:	11	Motivational Language?	
Hedging Phrase	Page number		
"Targets will remain flexible"	ii		
financially lean years'	ii		
favorable return on investment'	ii		
all emissions goals will be contingent on'	ii		
The trend below is very conservative'	4		
"before agreeing to invest"	10		
"all emissions goals contingent on funding"	11		
"challenging fiscal years"	11		
"separate review and approval process"	11		
"it will be a challenge to keep emissions as level as they hav	12		
"if this position is not funded... fall back by two years	14		

Plan Authors	Offsets:
Committee and research assistants, staff, one professor	Discussed as essential if undesirable requirement to achieving neutrality (which, they don't propose to do.)

Table I-4. University of California, Berkeley content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	University of California, Berkeley	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	32100			
Majority of Degrees	4-year			
Date of neutrality				
Plan length (pages)	25			
Quantitative Emissions				
Total Emissions Reported	207513			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year		
Expected portion of total in off-sets at end date		Milestone 1		
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases:	0	Ethical Language?		
Imperative Phrase	Page number			
Number of Hedging phrases:	0	Motivational Language?		
Hedging Phrase	Page number			
Plan Authors	Notes: Fine plan with lots of solid steps and methods. Very dry, little organizational information or motivational language, mostly just a report on efforts underta			

Table I-5. Grand Valley State University content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Grand Valley State University	2009 Scope 1 and 2	55502	
Ownership	Public			
Enrollment	22100			
Majority of Degrees	4-year			
Date of neutrality	2050			
Plan length (pages)	25			
Quantitative Emissions				
Total Emissions Reported	56778			
Aggregate of reported emissions	N/A			
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date	74331	Total		Total
Aggregate of Mitigated Emissions at end date	N/A	Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date	9000	Baseline year (2006)	2006	
Expected portion of total in off-sets at end date	12.00%	Milestone 1	2020	20.00%
Quantity of emissions mitigated including off sets	74331	Milestone 2	2030	50.00%
Quantity of emissions mitigated not including off sets	65331	Milestone 3	2050	100.00%
How has growth been accounted for?		Milestone 4		
Growth in emissions has been estimated at 1%/year (3)				
What kind of feedback will be used to update the plan?				
Acknowledged on page 7 but no specific process				
Content Analysis				
Number of Imperative phrases:	7	Ethical Language?		
Imperative Phrase	Page number			
Each project must take into account the effect on the univers	4			
All computers and electronics will be set to energy saving sp	19			
Desktop computers will be phased out	19			
All equipment will be shut down...	19			
Lights will be turned off...	19			
Equipment that is not in regular use will be unplugged	19			
Video conferences will be utilized in favor of of travel	19			
		None		
Number of Hedging phrases:	4	Motivational Language?		
Hedging Phrase	Page number			
“assumption that innovations at that time will provide”	15			
Scope 3 emissions not fully standardized, will wait until then	16			
“if they are undertaken”	18			
Purchases (when available) will consist of:	19			
		None		
Plan Authors				
Admin, faculty, staff, facilities				

Table I-6. University of Hawai'i Manoa content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	University of Hawai'i at Manoa	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	20500			
Majority of Degrees	4-Year			
Date of neutrality				
Plan length (pages)	39			
Quantitative Emissions				
Total Emissions Reported	116351			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	not given	
Expected portion of total in off-sets at end date		Milestone 1	2012	30.00%
Quantity of emissions mitigated including off sets		Milestone 2	2015	50.00%
Quantity of emissions mitigated not including off sets		Milestone 3	2020	quarter of energy from renewables
How has growth been accounted for?		Milestone 4	2050	"energy and water self-sufficiency"
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases:	0	Ethical Language?		
Imperative Phrase	Page number			
Number of Hedging phrases:	0	Motivational Language?		
Hedging Phrase	Page number			

Table I-7. University of California, Santa Barbara content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	University of California, Santa Barbara	2009 Scope 1 and 2		
Ownership	Public			
Enrollment	21000			
Majority of Degrees	4-Year			
Date of neutrality	2050			
Plan length (pages)	30			
Quantitative Emissions				
Total Emissions Reported	58671			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2000	
Expected portion of total in off-sets at end date		Milestone 1	2014	To 2020 levels
Quantity of emissions mitigated including off sets		Milestone 2	2020	To 1990 levels
Quantity of emissions mitigated not including off sets		Milestone 3	2050	Neutral
How has growth been accounted for?		Milestone 4		

Yes, a nice discussion of growth in the first couple of sections, with estimates and methodology as well as planning for a more accurate accounting for growth in future revisions of the plan.

What kind of feedback will be used to update the plan?

Content Analysis			
Number of Imperative phrases:	2	Ethical Language?	
Imperative Phrase	Page number		
"The campus must mitigate"	9		
"Essential that the university maintain"	30		
Number of Hedging phrases:	2	Motivational Language?	
Hedging Phrase	Page number		
"Due to the current economic state"	24		
"economic... slow progress"	29		

Plan Authors

Offsets:
Only as last resort and to be local and as controllable and stable as possible
Very good data and complete if not completely compelling planning
Very good plan, reasonable, complete, not terribly innovative or expressing of reasons or ideas, but technically good

APPENDIX J
4-YEAR PRIVATE CONTENT ANALYSIS STRATUM DATA

Table J-1. Union College content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Union College	2009 Scope 1 and 2		
Ownership	Private			
Enrollment	2116			
Majority of Degrees				
Date of neutrality	2060			
Plan length (pages)	15			
Quantitative Emissions				
Total Emissions Reported	21500			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2008	
Expected portion of total in off-sets at end date		Milestone 1	2015	15.00%
Quantity of emissions mitigated including off sets		Milestone 2	2025	34.00%
Quantity of emissions mitigated not including off sets		Milestone 3	2035	53.00%
How has growth been accounted for?		Milestone 4	2045	72.00%
			2055	91.00%
			2060	100.00%
p2; "this document is meant to be a dynamic one and goals should be adjusted as the environmental issues change..."				
What kind of feedback will be used to update the plan?				

Content Analysis			
Number of Imperative phrases:	4	Ethical Language?	
Imperative Phrase	Page number		
"To more aggressively meet the needs of the planet"	2		
"Union is committed to promoting an ecologically friendly ca	5		
"Union's continued commitment to not only energy savings,	11		
"new buildings... in the future will be designed and built to a	14		
		p2; "As the Environmental Stewards"	
Number of Hedging phrases:	1	Motivational Language?	
Hedging Phrase	Page number		
"That provide reasonable ROI and expedient payback"	4		

Plan Authors Notes:

Table J-2. Kalamazoo College content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Kalamazoo College	2009 Scope 1 and 2		
Ownership	Private			
Enrollment	1353			
Majority of Degrees				
Date of neutrality	2050			
Plan length (pages)	26			
Quantitative Emissions				
Total Emissions Reported	13500			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2008	
Expected portion of total in off-sets at end date		Milestone 1	2020	25.00%
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
Content Analysis	1			
Number of Imperative phrases:	0	Ethical Language?		
Imperative Phrase	Page number			
"College must ensure that its campus and plan operations.."	3			
		p1, recognition of Brundtland Report, and anthropogenic intergenerational justice as motivation for planning efforts, p3 reiteration of support for anthropocentric view of environment		
Number of Hedging phrases:	0	Motivational Language?		
Hedging Phrase	Page number			
Plan Authors	Notes: Offsets will not be used and a distrust of their effectiveness is given as reason, very good discussion of offsets in context Solid and focused discussion of context and approach supported by but not completely described plan to eliminate emissions			

Table J-3. Wesleyan College content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Wesleyan College	2009 Scope 1 and 2		
Ownership	Private			
Enrollment	506			
Majority of Degrees				
Date of neutrality	2047			
Plan length (pages)	9			
Quantitative Emissions				
Total Emissions Reported	7000			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2008	
Expected portion of total in off-sets at end date		Milestone 1	2017	
Quantity of emissions mitigated including off sets		Milestone 2	2027	
Quantity of emissions mitigated not including off sets		Milestone 3	2037	
How has growth been accounted for?		Milestone 4	2047	
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases:	0	Ethical Language?		
Imperative Phrase	Page number			
Number of Hedging phrases:	3	Motivational Language?		
Hedging Phrase	Page number			
due to time constraints'	1			
strategic paragraph, puts off planning to some future tim	5			
"we will require new budgets at a time when existing budget	8			
Plan Authors	Notes:			

Table J-4. Rhodes College content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Rhodes College	2009 Scope 1 and 2		
Ownership	Private			
Enrollment	1662			
Majority of Degrees				
Date of neutrality				
Plan length (pages)	11			
Quantitative Emissions				
Total Emissions Reported	11000			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year		
Expected portion of total in off-sets at end date		Milestone 1		
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
Acknowledged but not specifically defined				
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases:	2	Ethical Language?		
Imperative Phrase	Page number			
the commitment requires real change of us.'	1			
'the bottom line is Rhodes made a commitment... a priority th	10			
Number of Hedging phrases:	5	Motivational Language?		
Hedging Phrase	Page number			
'we will chart our progress to confirm that our emissions are	1			
we hope to reduce our CO2e emissions by at least 15%'	3			
carbon footprint as much as we can'	3			
potentially..'	6			
personal choices about transportation are difficult to impact'	7			
Plan Authors	Notes:			
	Great discussion and awareness of problem			
	Offsets to be used as needed			
	Several notes added to plan notes about methodology and other things to discuss in dissertation			

Table J-5. Gettysburg College content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Gettysburg College	2009 Scope 1 and 2		
Ownership	Private			
Enrollment	2439			
Majority of Degrees				
Date of neutrality	2032			
Plan length (pages)	24			
Quantitative Emissions				
Total Emissions Reported	19000			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2007	
Expected portion of total in off-sets at end date		Milestone 1	2015	25.00%
Quantity of emissions mitigated including off sets		Milestone 2	2025	30.00%
Quantity of emissions mitigated not including off sets		Milestone 3	2032	100.00%
How has growth been accounted for?		Milestone 4		
Long term planning is for no growth for 25 years				
What kind of feedback will be used to update the plan?				
Changes in plan can take place at any time with major revisions planned for in 2015 and 2025 (p22)				
Content Analysis				
Number of Imperative phrases:	4	Ethical Language?		
Imperative Phrase	Page number			
"The urgency of GCC not only necessitates changes in behe	2			
"... the responsibility we have to change."	2			
"The urgency of GCC not only necessitates changes in behe	3			
"While we recognize that it will be challenging to reach carbo	3			
		p18. "Sustainability transcends the disciplines of economics... it is therefore..." Seeing sus as being integral to all efforts of education and operations rather than a separate thing.		
Number of Hedging phrases:	2	Motivational Language?		
Hedging Phrase	Page number			
"Although our renovations are designed to improve our ener	9			
"This new master plan will make the campus more environm	21			
Plan Authors	Notes: Plan for 2032 as neutrality date coincides with bicentennial of college, emphasizing the importance of the neutrality project as on par wi			

Table J-6. Franklin College of Indiana content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Franklin College of Indiana	2009 Scope 1 and 2		
Ownership	Private			
Enrollment	1049			
Majority of Degrees				
Date of neutrality				
Plan length (pages)	29			
Quantitative Emissions				
Total Emissions Reported	9000			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2007	
Expected portion of total in off-sets at end date		Milestone 1	2013	10.00%
Quantity of emissions mitigated including off sets		Milestone 2	2023	25.00%
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases:	0	Ethical Language?		
Imperative Phrase	Page number			
is committed to these principles and the careful analysis anc	3			
"A fundamental... is the incorporation of environmental susta	13			
		p11; "electricity... comes at a high cost when one considers the environmental impact of both mining and the burning of fossil fuels" p13; "allow Franklin College to contain and reduce emission of greenhouse gases and less impact on local ecosystems."		
Number of Hedging phrases:	0	Motivational Language?		
Hedging Phrase	Page number			
Plan Authors	Notes: Lots of discussion of communications, little about emissions p16; mention of long-term thinking about the commitment to the project			

Table J-7. Keystone College content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Keystone College	2009 Scope 1 and 2		
Ownership	Private			
Enrollment	1536			
Majority of Degrees				
Date of neutrality	2050			
Plan length (pages)	17			
Quantitative Emissions				
Total Emissions Reported	5500			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year		
Expected portion of total in off-sets at end date		Milestone 1		
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases:		0	Ethical Language?	
Imperative Phrase	Page number			
Number of Hedging phrases:		3	Motivational Language?	
Hedging Phrase	Page number			
"...as our financial resources allow"	1			
"... as/when funding permits."	4			
"... with lower emissions where feasible"	6			

Plan Authors

Notes:
Not really a plan, more a collection of notes for all things green, no focus, no plan, nothing being done]

Table J-8. University of Miami content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	University of Miami	2009 Scope 1 and 2		
Ownership	Private			
Enrollment	14854			
Majority of Degrees				
Date of neutrality				
Plan length (pages)	50			
Quantitative Emissions				
Total Emissions Reported	243000			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2005	
Expected portion of total in off-sets at end date		Milestone 1	2020	20.00%
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
They will update every year or every other year or whenever.				
Content Analysis				
Number of Imperative phrases:	1	Ethical Language?		
Imperative Phrase	Page number			
"This reduction will occur despite growth in the university's b	39			
		None		
Number of Hedging phrases:	8	Motivational Language?		
Hedging Phrase	Page number			
"..possible scenarios to reduce … within a given time frame.	3			
".. recommendations within this report can be further explore	3			
"attempt to reach a minimum standard of LEED Silver	11			
"... will stive to achieve a higher level"	11			
"by certain reasonable dates"	37			
"possible paths the unversity could take to reduce emissions	37			
"looks for the most viable options to provide economic and e	45			
"fully supports the use of Renewable energy and seeks to fir	45			
		None		
Plan Authors	Notes:			
	Super weasily, all management speak and very little information about actually doing anything			
	Terrible spelling, grammar, and punctuation; the whole thing reads like an introduction without ever describing anything substantive, ter			
	Offsets will be used as needed			

Table J-9. Dickinson College content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Dickinson College	2009 Scope 1 and 2		
Ownership	Private			
Enrollment	2377			
Majority of Degrees				
Date of neutrality	2020			
Plan length (pages)	47			
Quantitative Emissions				
Total Emissions Reported	15500			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year		
Expected portion of total in off-sets at end date		Milestone 1		
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
Buildings are expected to grow but enrollment is expected to stay the same				
What kind of feedback will be used to update the plan?				
Annual updates				
Content Analysis				
Number of Imperative phrases:	0	Ethical Language?		
Imperative Phrase	Page number			
"Global climate change demands immediate action. Dickinso	47			
		"Dickinson known for the quality of its environmental		
Number of Hedging phrases:	0	Motivational Language?		
Hedging Phrase	Page number			
Plan Authors	Notes: straight forward, on topic, complete, good plan			
	Stated distrust of the legitimacy of purchased offsets, though they will be used to achieve neutrality, they will work to use as few as possible and to eliminate their use, stated that they are somehow inferior to on-campus emissions mitigation efforts, p13, 37			

Table J-10. University of Puget Sound content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	University of Puget Sound	2009 Scope 1 and 2		
Ownership	Private			
Enrollment	2776			
Majority of Degrees				
Date of neutrality	2025			
Plan length (pages)	9			
Quantitative Emissions				
Total Emissions Reported	11500			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year		
Expected portion of total in off-sets at end date		Milestone 1		
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases:	0	Ethical Language?		
Imperative Phrase	Page number			
		p1 Intergeneration Justice Ethic		
Number of Hedging phrases:	1	Motivational Language?		
Hedging Phrase	Page number			
"Puget Sound must consider its limited human and financial	1			
Plan Authors	Notes: Offsets to be used as last resort			

Table J-11. LaGrange College content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	LaGrange College	2009 Scope 1 and 2		
Ownership	Private			
Enrollment	934			
Majority of Degrees				
Date of neutrality				
Plan length (pages)	22			
Quantitative Emissions				
Total Emissions Reported	8000			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year	2007	
Expected portion of total in off-sets at end date		Milestone 1	2014	10.00%
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
1% growth estimated, p5				
What kind of feedback will be used to update the plan?				
Content Analysis				
Number of Imperative phrases:	0	Ethical Language?		
Imperative Phrase	Page number			
Number of Hedging phrases:	3	Motivational Language?		
Hedging Phrase	Page number			
"...saw the change to a new College President... immense cl	6			
"faces serious financial constraints... may recommend some	9			
"created under the previous College administration; the deci	15			
Plan Authors	Notes:			

No plan for neutrality, only suggestions of behavioral changes, lots of references to changing administration. P6, 7
Plan to use cost savings as a proxy for emissions reduction
No plans to use offsets

Table J-12. Lewis & Clark College content data.

Sorting		Sources of emissions and totals		Mitigation Strategies and totals
Name	Lewis & Clark College	2009 Scope 1 and 2		
Ownership	Private			
Enrollment	3523			
Majority of Degrees				
Date of neutrality				
Plan length (pages)	7			
Quantitative Emissions				
Total Emissions Reported	24000			
Aggregate of reported emissions				
Emissions reported difference				
Quantitative Mitigation				
Total Emissions Mitigated at end date		Total		Total
Aggregate of Mitigated Emissions at end date		Mile stone mitigation tracking	Emissions	Change from base
Expected quantity of off-sets at end date		Baseline year		
Expected portion of total in off-sets at end date		Milestone 1		
Quantity of emissions mitigated including off sets		Milestone 2		
Quantity of emissions mitigated not including off sets		Milestone 3		
How has growth been accounted for?		Milestone 4		
What kind of feedback will be used to update the plan?				
Plan updated on an annual basis				
Content Analysis				
Number of Imperative phrases	3	Ethical Language?		
Imperative Phrase	Page number			
has incited the College to take action'	1			
'key to success for lewis and clark'	2			
the responsible parties shall immediately implement additior	7			
		"The tougher challenge inherent in this goal is to have sustainability become naturally embodied in the behavior of the Lewis and Clark community" p5		
Number of Hedging phrases	4	Motivational Language?		
Hedging Phrase	Page number			
intent to achieve'	2			
intended to fund energy...simple financial payback of less th	4			
those projects that offer maximum potential for carbon footp	7			
the responsible parties shall immediately implement additior	7			
Plan Authors	Notes:			
Everyone	CACP system used			
	Credits to be used as little as possible			

APPENDIX K
CONTENT ANALYSIS CONSOLIDATED DATA TABLES

Table K-1. 2-year public stratum content analysis summary table.

Institution	Enrollment	Emissions	Date of Neutrality	Length of Plan	Imperative Phrases	Hedging Phrases	Ethical Language Present	Motivational Language Present
Delta College	7123	25000	N/A	63	0	0	Yes	No
Northern Essex Community College	3922	10500	2040	9	0	0	No	No
Chabot College	10533	18000	2050	45	0	0	No	No
Onondaga Community College	3128	15500	N/A	13	1	1	No	Yes
Madison Area Technical College	10829	25500	N/A	24	0	0	No	No
Cabrillo College	11610	9000	N/A	18	0	0	No	No
University of South Carolina Su	722	2000	N/A	10	1	1	No	No
Means	6838	15071	2045	26	0	0		

Table K-2. 4-year public small stratum content analysis summary table.

Institution	Enrollment	Emissions	Date of Neutrality	Length of Plan	Imperative Phrases	Hedging Phrases	Ethical Language Present	Motivational Language Present
Northern Arizona University	22745	79000	2020	39	2	3	Yes	Yes
Oregon State University	18432	150000	2025	44	3	1	Yes	No
University of Idaho	10775	39500	2030	26	0	0	Yes	Yes
Eastern Washington University	9225	50000	N/A	13	2	1	Yes	No
University of Colorado at Color	7638	29000	N/A	39	2	6	No	No
William Paterson University of	8437	42000	N/A	27	0	2	Yes	No
New College of Florida	786	7000		32	0	5	Yes	No
James Madison University	17339	77500		53	6	4	Yes	Yes
University of Minnesota-Morris	1607	15000	2010	13	0	0	No	No
Means	10776	54333	2021	32	2	2		

Table K-3. 4-year public large stratum content analysis summary table.

Institution	Enrollment	Emissions	Date of Neutrality	Length of Plan	Imperative Phrases	Hedging Phrases	Ethical Language Present	Motivational Language Present
University of Oklahoma Norman Campus	27500	253789	2050	9	2	0	Yes	No
University of Utah	29000	271341	N/A	55	5	1	Yes	No
George Mason University	28900	101991	N/A	19	4	11	No	No
University of California, Berkeley	32100	207513	N/A	25	0	0	No	No
Grand Valley State	22100	56778	2050	25	7	4	No	No
University of Hawai'i at Manoa	20500	116351	N/A	39	0	0	No	No
University of California, Santa	21000	58671	2050	30	2	2	No	No
Mean	25871	152348	2050	29	2.9	2.6		

Table K-4. 4-year private stratum content analysis summary table.

Institution	Enrollment	Emissions	Date of Neutrality	Length of Plan	Imperative Phrases	Hedging Phrases	Ethical Language Present	Motivational Language Present
Union College	2116	21500	2060	15	4	1	Yes	No
Kalamazoo College	1353	13500	2050	26	0	0	Yes	No
Wesleyan College	506	7000	2047	9	0	3	No	No
Rhodes College	1662	11000	N/A	11	2	5	No	No
Gettysburg College	2439	19000	2032	24	4	2	Yes	No
Franklin College of Indiana	1049	9000	N/A	29	0	0	Yes	No
Keystone College	1536	5500	2050	17	0	3	No	No
University of Miami	14854	243000	N/A	50	1	8	No	No
Dickinson College	2377	15500	2020	47	0	0	Yes	No
University of Puget Sound	2776	11500	2025	9	0	1	Yes	No
LaGrange College	934	8000	N/A	22	0	3	No	No
Lewis & Clark College	3523	24000	N/A	7	3	4	Yes	No
Mean	2927.083	32375	2040.571	22.1667	1.166667	2.5		

APPENDIX L
PEARSON'S CHI SQUARED AND FISHER'S EXACT TEST TABLES

Table L-1. Pearson's chi-squared test for strata and presence of ethical language.

Strata	Yes	No	Total
2-Year Public	1	6	7
4-Year Public Small	7	2	9
4-Year Public Large	2	5	7
Private	7	5	12
Total	17	18	35

DF=3 P-Value=0.047

Table L-2. Pearson's chi-squared test for strata and presence of motivational language.

Strata	Yes	No	Total
2-Year Public	1	6	7
4-Year Public Small	3	6	9
4-Year Public Large	0	7	7
Private	0	12	12
Total	4	31	35

DF=3 P-Value=0.079

Table L-3. Pearson's chi-squared test for strata and ethical language expected distribution.

Strata	Yes	No	Total
2-Year Public	3.4	3.6	7
4-Year Public Small	4.37	4.63	9
4-Year Public Large	3.4	3.6	7
Private	5.83	6.17	12
Total	17	18	35

DF=3 P-Value=1

Table L-4. Pearson's chi-squared test for strata and motivational language expected distribution.

Strata	Yes	No	Total
2-Year Public	3.4	3.6	7
4-Year Public Small	4.37	4.63	9
4-Year Public Large	3.4	3.6	7
Private	5.83	6.17	12
Total	17	18	35

DF=3 P-Value=0.8

Table L-5. Pearson's chi-squared test for strata and hedging or imperative language present.

Strata	Yes	No	Total
2-Year Public	2	5	7
4-Year Public Small	7	2	9
4-Year Public Large	5	2	7
Private	9	3	12
Total	23	12	35

DF=3 P-Value=0.143

Table L-6. Pearson's chi-squared test for strata and imperative language present.

Strata	Yes	No	Total
2-Year Public	2	5	7
4-Year Public Small	5	4	9
4-Year Public Large	5	2	7
Private	5	7	12
Total	17	18	35

DF=3 P-Value=0.393

Table L-7. Pearson's chi-squared test for strata and hedging language present.

Strata	Yes	No	Total
2-Year Public	2	5	7
4-Year Public Small	7	2	9
4-Year Public Large	4	3	7
Private	9	3	12
Total	22	13	35

DF=3 P-Value=0.155

Table L-8. Pearson's chi-squared test for any language present.

Strata	Yes	No	Total
2-Year Public	3	4	7
4-Year Public Small	8	1	9
4-Year Public Large	5	2	7
Private	12	0	12
Total	28	7	35

DF=3 P-Value=0.02

Table L-9. Pearson's chi-squared test for strata and histogram distribution of imperative language present.

Strata	None	1 or 2	3 or 4	5 or more	Total
2-Year Public	5	2	0	0	7
4-Year Public Small	4	3	1	1	9
4-Year Public Large	2	2	1	2	7
Private	7	2	3	0	12
Total	18	9	27	3	35

DF=3 P-Value=0.02

Table L-10. Pearson's chi-squared test for strata and histogram distribution of hedging language present.

Strata	None	1 or 2	3 or 4	5 or more	Total
2-Year Public	5	2	0	0	7
4-Year Public Small	2	3	2	2	9
4-Year Public Large	3	2	1	1	7
Private	3	3	4	2	12
Total	13	10	7	5	35

DF=3 P-Value=0.02

Table L-11. Pearson's chi-squared test for strata and histogram distribution of normative imperative language present.

Strata	None	0.01 to 0.20	0.21 to 0.40	0.41 to up	Total
2-Year Public	5	2	0	0	7
4-Year Public Small	2	3	2	2	9
4-Year Public Large	3	2	1	1	7
Private	3	3	4	2	12
Total	13	10	7	5	35

DF=3 P-Value=0.02

Note: Normalized data is for phrases per page of plan.

Table L-12. Pearson's chi-squared test for strata and histogram distribution of normative hedging language present.

Strata	None	0.01 to 0.20	0.21 to 0.40	0.41 to up	Total
2-Year Public	5	2	0	0	7
4-Year Public Small	2	7	0	0	9
4-Year Public Large	3	3	1	0	7
Private	3	6	1	2	12
Total	13	18	31	2	35

DF=3 P-Value=0.02

Note: Normalized data is for phrases per page of plan.

Table L-13. Pearson's chi-squared test for strata and presence of stated neutrality date.

Strata	Yes	No	Total
2-Year Public	2	5	7
4-Year Public Small	4	5	9
4-Year Public Large	3	4	7
Private	7	5	12
Total	4	31	35

DF=3 P-Value=0.635

Table L-14. Pearson's chi-squared test for strata and presence of ethical or motivational language.

Strata	Yes	No	Total
2-Year Public	2	5	7
4-Year Public Small	7	2	9
4-Year Public Large	2	5	7
Private	7	5	12
Total	18	17	35

DF=3 P-Value=0.129

Table L-15. Fisher's exact test for 4-year public large and small strata, and ethical language.

Strata	Yes	No	Total
4-Year Public Small	7	2	9
4-Year Public Large	2	5	7
Total	9	7	16

DF=1 P-Value=0.049

Table L-16. Fisher's exact test for 4-year public combined and 2-year strata, and ethical language.

Strata	Yes	No	Total
4-Year Public combined	9	7	16
2-Year Public	1	6	7
Total	10	13	23

DF=1 P-Value=0.089

Table L-17. Fisher's exact test for all public combined and private strata, and ethical language.

Strata	Yes	No	Total
Public combined	10	13	23
Private	7	5	12
Total	17	18	35

DF=1 P-Value=1

Table L-18. Fisher's exact test for 4-year public combined and private strata, and ethical language.

Strata	Yes	No	Total
4-Year Public combined	10	13	23
Private	7	5	12
Total	17	18	35

DF=1 P-Value=1

Table L-19. Fisher's exact test for 4-year public large and small strata, and presence of any language.

Strata	Yes	No	Total
4-Year Public Small	8	1	9
4-Year Public Large	5	2	7
Total	13	3	16

DF=1 P-Value=0.55

Table L-20. Fisher's exact test for 4-year public combined and 2-year strata, and presence of any language.

Strata	Yes	No	Total
4-Year Public combined	13	3	16
2-Year Public	8	1	9
Total	21	4	25

DF=1 P-Value=0.106

Table L-21. Fisher's exact test for all public combined and private strata, and presence of any language.

Strata	Yes	No	Total
Public combined	21	4	25
Private	12	0	12
Total	33	4	37

DF=1 P-Value=0.368

Table L-22. Fisher's exact test for 4-year public combined and private strata, and presence of any language.

Strata	Yes	No	Total
4-Year Public combined	13	3	16
Private	12	0	12
Total	25	3	28

DF=1 P-Value=1

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BIOGRAPHICAL SKETCH

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