UNDERSTANDING THE PRESIDENT'S CLIMATE COMMITMENT: TOWARD A CARBON NEUTRAL FLORIDA GULF COAST UNIVERSITY

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October 29, 2008

PREFACE

The Center for Environmental and Sustainability Education is a Type Two Research Institute of Florida Gulf Coast University. The Center is comprised of faculty, students, and administrators from all Colleges.

Part of the Center's mission[1] is to advance understanding and achievement of the goals of environmental and sustainability education through innovative educational research methods, emergent eco-pedagogies, and educational philosophy and practice based on ethics of care and sustainability. Our mission also includes the statement, "The Center seeks to elevate the environmental mission of Florida Gulf Coast University and serve the University community, the local community of the Western Everglades and Barrier Islands, and the wider community of scholars."

We have long held "greening the university" as a critical dimension of our work. One of our objectives for this academic year is to provide advice and expertise to the administration on a variety of projects in environmental sustainability. We believe that institutional practice is a *sine qua non* of education for sustainability. With David Orr, we believe that architecture is "crystallized pedagogy" – and that we learn much from the human-made systems that surround us in educational settings. We offer this white paper as part of the Center's commitment to action.

We have enjoyed a creative partnership with Administrative Services in pursuing the University's mission in environmental sustainability. We hope the analysis and recommendations in this paper will be a contribution to President Bradshaw's climate commitment.

Dr. Clugston is a leading figure in sustainability in higher education. He is the former Executive Director of University Leaders for a Sustainable Future. We see his paper as a beginning. The Center would be pleased to continue to work with the Administration toward a carbon neutral Florida Gulf Coast University.

Peter Blaze Corcoran

[1] Please refer to Appendix E for the full text of the Center's mission preamble, mission statement, and goals.

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INTRODUCTION

This white paper is designed to assist the Florida Gulf Coast University community in charting its path toward carbon neutrality as a Leadership Circle signatory of the American College and University Presidents Climate Commitment. It was commissioned by the Center for Environmental and Sustainability Education for presentation to President Wilson Bradshaw, Provost Ronald Toll, and Vice President Joe Shepard.

A. The American College and University Presidents Climate Commitment (ACUPCC) and Florida Gulf Coast University's obligations as a signatory

Interim President Richard Pegnetter signed the American College and University Presidents Climate Commitment (ACUPCC or PCC) in the spring of 2007, committing FGCU to eliminate its greenhouse gas emissions in a reasonable period of time. The PCC requires that each signatory accomplish the following:

i. Set up a mechanism (committee, task force, office, etc.) within 2 months to guide the process.

ii. Complete an inventory of greenhouse gas emissions within 1 year.

iii. Create and implement a climate neutral plan (that includes a target date and interim milestones for achieving campus climate neutrality) within 2 years.

iv. Take 2 of 7 immediate steps specified in the commitment to reduce greenhouse gas emissions while the more comprehensive plan is being developed. (These steps include: new campus construction LEED Silver [Leadership in Energy and Environmental Design] standard or equivalent; energy-efficient appliance purchasing; offsetting all greenhouse gas emissions generated by air travel paid for by the institution; public transportation purchasing; or producing at least 15% of the institution's electricity consumption from renewable sources.)

v. Integrate sustainability into the curriculum and make it part of the educational experience.

vi. Make the action plan, inventory and periodic progress reports publicly available. (ACUPCC Implementation Guide, 2007, p.21)

To date, FGCU has established the mechanism, a sub-committee of the President's Environmental Stewardship Advisory Council (ESAC) chaired by Lewis Johnson. It has also taken three immediate steps committing FGCU to 1. building to the LEED Silver standard or equivalent; 2. purchasing Energy Star appliances and the best (gold certified) computers; and 3.

encouraging public transport. Though not listed as an FGCU immediate step or tangible action, building the solar farm will produce at least 15% of the institution's electricity from renewable sources. As of September 15, 2008, FGCU had conducted its emissions inventory based on the Clean Air-Cool Planet Campus Carbon Calculator. The major task for this next year is to create and begin implementing a carbon neutral plan by September 15, 2009.

B. Colleges and Universities Respond to the Growing Concern over Climate Change

Over the past two years there has been an explosion of public awareness of the urgency of dealing with climate change, e.g., "An Inconvenient Truth," the Nobel Peace Prize to Al Gore and the IPCC (Intergovernmental Panel on Climate Change), the Bali conference. Even the Bush administration, long resistant to the Kyoto Protocol, has recognized the significance of the challenge. The United States congress is debating a variety of GHG (Greenhouse Gas) reduction bills (Cap and Trade proposals). Increasingly, state and municipal governments and a range of institutions are not waiting for federal legislation, but are making their own commitments. (The PCC was modeled after a climate commitment signed by mayors of US cities.)

A growing number of colleges and universities are taking major steps to reduce their GHG emissions. Some 500 have signed the PCC, and many others have developed GHG reduction plans independent of the PCC, such as Yale University's Greenhouse Gas Reduction Strategy. Some 800 higher education institutions have downloaded the Clean Air-Cool Planet Campus Carbon Calculator (CA-CPCCC or CA-CP Campus Carbon Calculator), including most of the PCC institutions.

Moving toward carbon neutrality requires the reduction of an institution's carbon footprint by taking the following steps:

i. Conduct a GHG emissions inventory, such as CACPCCC (or as part of a more comprehensive Life Cycle Analysis or Ecological Footprint Analysis) to accurately determine the current campus carbon footprint.

ii. Identify hot-spots in terms of energy consumption and associated CO2-emissions.

iii. Buy electricity (and other forms of energy) from renewable sources, usually through Renewable Energy Credits (RECs) - sometimes called TRECs, the T meaning "tradable". These are called credits because the institution may not be receiving the renewable (e.g., wind, solar) energy it has purchased.

iv. Optimize energy efficiency and reduce GHG emissions contributed from production processes.

v. Identify solutions to neutralize the CO2 emissions that cannot be eliminated by energy saving measures, usually through purchasing carbon offsets, and investment in projects that aim to reduce CO2 emissions.

PART ONE: DEFINING AN INSTITUTION'S CARBON FOOTPRINT AND CONDUCTING A GREEN HOUSE GAS (GHG) EMISSIONS INVENTORY

"For purposes of the ACUPCC, climate neutrality is defined as having no net greenhouse gas (GHG) emissions, to be achieved by minimizing GHG emissions as much as possible, and using carbon offsets or other measures to mitigate the remaining emissions…It is recommended that participating campuses use Clean Air-Cool Planet's Campus Carbon Calculator (http://www.cleanair-coolplanet.org/toolkit/content/view/43/124/) to calculate their total emissions. At a minimum, participating campuses should include in their inventories emissions produced through on-site combustion of fossil fuels; electricity consumption; student, faculty, and staff commuting; and institution-funded air travel. As the inventory methodology develops and to the extent practical, participating institutions should also endeavor to evaluate embodied emissions in purchased goods and services, including food." (ACUPCC Implementation Guide, 2007, p.11)

A. The Greenhouse Gases

The major greenhouse gases and their global warming potential are as follows. (Most colleges and universities only emit the first three.)

Carbon Dioxide (CO_2) remains in the atmosphere 50-200 years, and is the base gas for calculating global warming potential at a factor of 1.

Methane (CH_4) stays in the atmosphere 9-15 years and is 21 times as potent as carbon dioxide (emitted from animal agriculture and landfills).

Nitrous Oxide (N_2O) lingers 120 years and has a global warming potential of 310.

HydroFluoroCarbon (HFC) 134a – atmospheric life of 15 years, 1300 times as potent

HydroFluoroCarbon (HFC) 404a – 48 years, 3260 times as potent (replaced CFCs, usually emitted through refrigeration leakage)

Sulfur Hexafluoride (SF_6) – 3200 years, 23900 times as potent

(Source: Clean Air-Cool Planet, 2006, p.20)

The Clean Air-Cool Planet Calculator converts all types of GHG emissions to a common unit of measurement, metric tons of carbon dioxide equivalent (MTCO2e or MTCDE), that can be used to compare all emissions.

B. The Scopes

The World Business Council for Sustainable Development and the World Resource Institute (WBCSD/WRI) jointly established a set of accounting standards[2] to guide emission reporting endeavors. These standards [called the Greenhouse Gas Protocol] identify operational boundaries for institutions to 'scope' their sources of emissions in order to provide accountability for prevention of "double counting" or conversely, "double credits." Roughly, there are three scopes:

Scope 1 – includes all direct sources of GHG emissions from sources that are owned or controlled by the institution, including (but not limited to): production of electricity, heat, or steam; transportation of materials, products, waste, and community members; and fugitive emissions (from unintentional leaks).

Scope 2 – includes GHG emissions from imports of electricity, heat or steam – generally those associated with the generation of imported sources of energy.

Scope 3 – includes all other indirect sources of GHG emissions that may result from the activities of the institution but occur from sources owned or controlled by another company, such as: business travel, outsourced activities and contracts, emissions from waste generated by the institution when the GHG emissions occur at a facility controlled by another company, e.g. methane emissions from landfilled waste, and the commuting habits of community members.

The four major source-of-emissions categories on campus are: energy, agriculture, waste, and refrigeration and other chemicals. In addition, data is gathered about any greenhouse gas emissions "offsets" the institution has arranged, such as purchasing green power, or more likely, TRECs (tradable renewable energy certificates), forests managed for carbon sequestration, or composting.

Energy will likely be the largest source of emissions and is further divided into off-campus electricity production, off-campus steam production, on-campus stationary sources (such as heating and cooking) and transportation (university fleet, commuter traffic, and air travel). The other categories will probably add up to less than 10% of the total but are nonetheless important to estimate." (CA-CP Campus Carbon Calculator User's Guide, 2006, p.6-7)

The CA-CP Campus Carbon Calculator provides tables which each institution fills out concerning the above sources and scopes. The calculator then calculates the amounts of emissions from each source.

[2] World Business Council for Sustainable Development and the World Resource Institute, http://www.wbcsd.org/web/publications/ghg-protocol.pdf

C. FGCU's Emissions Inventory

FGCU, using the CA-CP Campus Carbon Calculator, calculated the following total emissions (Table One) and emissions by source (Table Two). (ACUPCC Reporting System 2008, GHG Report for FGCU, Sept.13, 2008)

TABLE ONE TOTAL EMISSIONS	Total	Per Full-Time Enrollment	Per 1000 Square Feet	% Offset
Gross emissions (Scopes 1 + 2):	19,439 metric tons of CO2e	2.6 metric tons of CO2e	9.4 metric tons of CO2e	0%
Gross emissions (Scopes 1 + 2 + 3):	29,691 metric tons of CO2e	4 metric tons of CO2e	14.4 metric tons of CO2e	0%
Net emissions:	29,691 metric tons of CO2e	4 metric tons of CO2e	14.4 metric tons of CO2e	N/A

TABLE TWO EMISSIONS BY SOURCE	
Scope 1 Emissions	
Stationary Combustion	49
Mobile Combustion	269
Process Emissions	0
Fugitive Emissions	0
Total Scope 1 emissions:	318 MTCDE (metric tons of carbon dioxide equivalent)
Scope 2 Emissions	
Purchased Electricity	19,121
Purchased Heating	0
Purchased Cooling	0
Purchased Steam	0
Total Scope 2 emissions:	19,121 MTCDE
Scope 3 Emissions	
Commuting	9,411
Air Travel	841
Solid Waste	No information provided.
Total Scope 3 emissions:	10,252 MTCDE

D. Comparing the amount and sources of FGCU's emissions with other institutions

1. Comparisons of the amount of emissions: The ACUPCC database presents the same tables as above for all schools which have reported their emissions to date. Virtually all schools use the CA-CP Campus Carbon Calculator. Total emissions, of course, reflect primarily the size of the institution and secondarily its geographic location (need for heating and/or cooling) and the energy efficiency of the infrastructure. More meaningful comparisons can be made by looking at emissions per full time enrollment or per 1000 square feet. Comparing FGCU to a sample of 17 other PCC signatory colleges and universities, the average emissions of the 17 schools is 4.9 MTCDE per FTE student, and 19.0 MTCDE per 1000 square feet. FGCU is 4 MTCDE per FTE student and 14.4 MTCDE per 1000 square feet, significantly below the average.

2. Comparisons of the Sources of emissions: The sources of emissions vary geographically with northern schools with their own heating plants having large on campus stationary source emissions, and urban schools with well developed public transportation (e.g. in New York City) having little commuting emissions.

The University of New Hampshire (UNH) summary table below is more typical than FGCU's (which follows) of most schools in the rough proportions of emissions coming from various sources.

Percentages of UNH emissions by source in 2005:

On Campus Stationary Sources: 48%
Purchased Electric: 35%
Transportation: Commuting Faculty/Staff: 10%
Transportation: Commuting Students: 4%
Transportation: University Fleet: 3%
Agriculture: 1%
Solid Waste: N/A

Total UNH Emissions (in MTCDE): 68,324
(UNH Office of Sustainability Programs GHG Report, 2007)

Percentages of FGCU emissions by source in 2007:

On Campus Stationary Sources: 0.2%
Purchased Electric: 64%
Transportation: Commuting Faculty/Staff/Students: 32%
Transportation: University Fleet: 1%
Air Travel: 3%

Total FGCU Emissions (in MTCDE): 29,691

E. What is not measured? The limits of the ACUPCC emissions inventory

> "At a minimum, participating campuses should include in their inventories emissions produced through on-site combustion of fossil fuels; electricity consumption; student, faculty, and staff commuting; and institution-funded air travel. As the inventory methodology develops and to the extent practical, participating institutions should also endeavor to evaluate embodied emissions in purchased goods and services, including food." (ACUPCC Implementation Guide, 2007, p.11)

This quote from the ACUPCC Implementation Guide points to a class of embodied emissions that contribute to an institution's carbon footprint, but like most "indirect" emissions, they are not included in the CA-CP inventory (including student travel and the carbon footprint of purchasing and construction).

In 2006-2007, the University of California, Berkeley Climate Action Partnership (CalCAP) – an on campus team of faculty, staff, and students – prepared a comprehensive inventory of GHG emissions and explored paths toward campus carbon neutrality. This example is instructive for any college or university seeking an accurate picture of their institution's actual carbon footprint. The following is quoted at length from the Feasibility Study 2006-2007 Final Report (see sustainability.berkeley.edu).

> "During the course of the inventory process, the CalCAP team recognized that the [Clean Air-Cool Planet] emissions inventory does not fully reflect the complete carbon footprint of the campus. The UC Berkeley emissions inventory is only a subset of our campus's total carbon footprint, as it excludes the full lifecycle carbon emissions associated with some of the campus activities. The Steering Committee decided that UC Berkeley should take a leadership role in documenting and reporting additional, optional sources of emissions such as procurement (university purchases including office supplies, furniture, food) and construction. A lifecycle analysis includes greenhouse gas emissions from all stages of a product or service's lifecycle, including mining, manufacturing, transportation, retail, use, and disposal.
>
> The CalCAP study included emissions based on lifecycle analysis for emissions sources such as purchased electricity (applying faculty research on the lifecycle emissions of power plants in lower Colorado), university procurement (accounting for goods, services and food procured by the university), and construction activities (accounting for emissions from facilities, goods, and services required for construction).
>
> The result of adding the lifecycle calculation to the emissions inventory estimates is striking. In 2006, the campus carbon footprint, according to lifecycle analysis, is at least 482,000 metric tons of CO2 equivalent, while the campus Emissions Inventory is only about 209,000 metric tons of CO2 equivalent.
>
> CalCAP defines UC Berkeley's climate footprint as the sum of all direct and lifecycle emissions of greenhouse gases resulting from the production of everything consumed by

> the University. We have estimated this to be roughly 480,000 metric tons of carbon dioxide equivalent gases for 2006" (CalCAP Study, 2007, p.26-27).

Even though CalCAP recognizes the limits of the CA-CP Emissions Inventory, they concluded:

> "To be consistent with current industry practices, the study chose to base its analysis and target recommendations on the Emissions Inventory. However, in coming years, CalCAP's goal is to continue measuring the true carbon footprint and prepare actionable recommendations for the administration that will address university purchasing and consumption decisions" (ibid., p.27).

Reducing direct emissions is a critical step, but becoming carbon neutral requires much more. In the UC Berkeley example, becoming carbon neutral on the dimensions that the CA-CP Carbon Calculator measures would eliminate less than half of the institution's carbon footprint.

PART TWO: DEVELOPING STRATEGIES FOR BECOMING CARBON NEUTRAL

> "For purposes of the ACUPCC, climate neutrality is defined as having no net greenhouse gas (GHG) emissions, to be achieved by minimizing GHG emissions as much as possible, and using carbon offsets or other measures to mitigate the remaining emissions." (ACUPCC Implementation Guide, 2007, p.11)

Institutions pursue carbon neutrality by implementing three basic strategies that aim at reducing and offsetting their emissions:

1. Become more energy efficient: This involves implementing a set of on campus projects that enhance energy conservation (e.g., through changing light bulbs, sensors, tracking down hot spots of fugitive emissions, educating students to turn off lights, bike to campus, etc.)

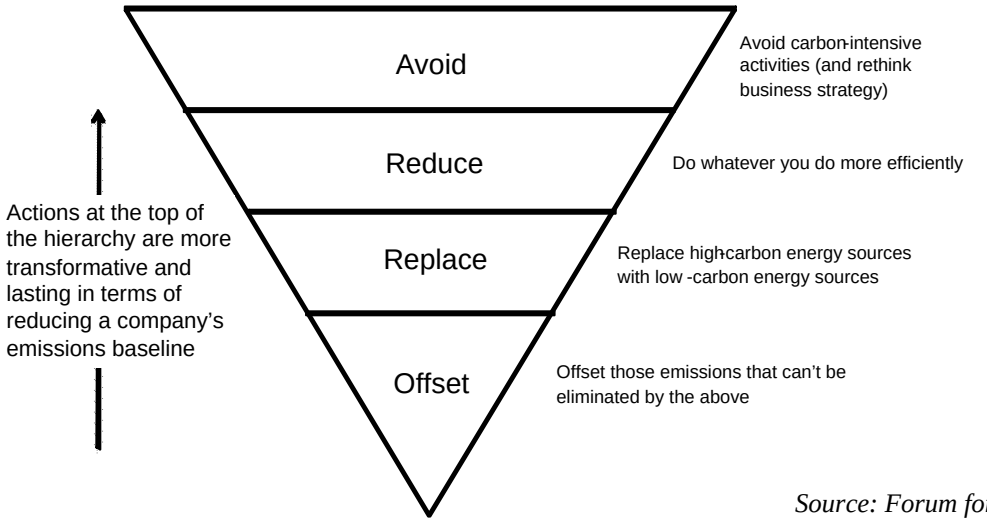
2. Shift to more renewable energy sources: purchase or generate low carbon energy (usually by purchasing RECs)

3. Purchase offsets

A. <u>The carbon management hierarchy</u>

A recent report produced by Clean Air – Cool Planet and Forum for the Future, entitled "Getting to Zero: Defining Corporate Climate Neutrality," offers a "carbon management hierarchy" illustrated in the figure below.

The carbon management hierarchy



Source: Forum for the Future (2008)

In this hierarchy the most important (and probably most difficult) set of actions is the *Avoid* actions, which involve avoiding expansion and consumption, e.g., square footage of dorm room per student, number of electronic devices per student, and so on.

Reduce means increasing the efficiency of light bulbs, appliances, buildings, HVAC systems, and other campus technologies. Many institutions have had in place programs to increase energy efficiency for almost a decade, so some probably have little more to do in this area.

Replace focuses on generating or purchasing energy from renewable sources (biodiesel for the fleet; solar or wind generated electricity, and so on).

A carbon *Offset* is a net reduction in carbon emissions because the avoidance of CO2 released somewhere else negates the effect of carbon released by the university. This means investing in renewable energy and energy efficiency projects that avoid the release of CO2 or other greenhouse gasses in other places

B. The ACUPCC's Recommended Comprehensive Strategy

While the ACUPCC recommends using the CA-CP Campus Carbon Calculator, it also recognizes that a comprehensive strategy for achieving carbon neutrality would include, like the UC Berkeley example, the evaluation and reduction of "embodied emissions in purchased goods and services, including food." Thus, in outlining the PCC recommended strategy, they go beyond the categories of the Campus Carbon Calculator, including the following elements:

1. Foster energy conservation and efficiency
    i. Building construction and retrofits
    ii. Energy saver programs
    iii. Master planning

2. Generate or buy renewable power
    i. Install wind, solar, geothermal power
    ii. Use biofuels
    iii. Purchase clean electricity from utility
    iv. Purchase offsets (which decrease steadily as campus "footprint" decreases)

3. Transportation systems
    i. Alternative fuels for fleet
    ii. Walkable/bikeable campuses, ensure bikes can get to campus
    iii. Good transit systems on and around campus
    iv. Student, staff, faculty incentives to drive less

4. Purchasing
    i. Buying local
    ii. Buying recycled

iii. Buying sustainable goods

5. Recycling/Waste
   i. Waste source reduction (e.g. paper, disposable dishes, packaging)
   ii. Composting, recycling

6. Campus food systems
   i. Local, sustainably grown

7. Investment in climate solutions
   i. Dedicated funds
   ii. Endowment used to support climate innovation, discourage negative impacts

8. Research and development
   i. New energy technologies
   ii. New system designs
   iii. Adaptation measures

9. Teach climate science, policy; educate community about climate solutions

10. Partner with communities/businesses to share climate expertise

("A Call for Climate Leadership," ACUPCC, 2007, p.7)

This ACUPCC recommended strategy goes far beyond the Scope 1 and 2 areas and includes the range of indirect contributions to an institution's carbon footprint. (Princeton Review's Green Rating Criteria in appendix C look comprehensively at campuses green practices in selecting institutions for the Green Honor Role. While including GHG emissions reduction and purchasing renewable energy as criteria, the rating criteria emphasize a boarder framework like the ACUPCC strategy above.)

C. Getting to Carbon Neutral: Two Examples

The first PCC carbon neutral plans are due, like FGCU's, on September 15, 2009, so there is little information on the mix of strategies these institutions are taking to get to carbon neutrality. The following are two examples of carbon neutral strategies.

Example One: the College of the Atlantic (COA) in Bar Harbor, Maine

College of the Atlantic claims to be "the first carbon neutral university." A small institution, its 2007 emissions were 1374 MTCDE with per full time equivalent student emissions of 4.4 and per 1000 square foot emissions of 11.4. These emissions were neutralized by offset purchases. The following is a quote from COA's NetZero website press release:

“On Oct. 8, 2006, at the inauguration of President David Hales, COA pledged to be Carbon NetZero by December 2007. Since then, COA students, staff and faculty have calculated the college's greenhouse gas emissions and researched ways to reduce, avoid and offset these emissions. As of Dec. 19, 2007, COA has offset the entirety of its carbon output over the past 15 months – 2,488 tons – by investing in a greenhouse gas reduction project operated by The Climate Trust of Oregon.

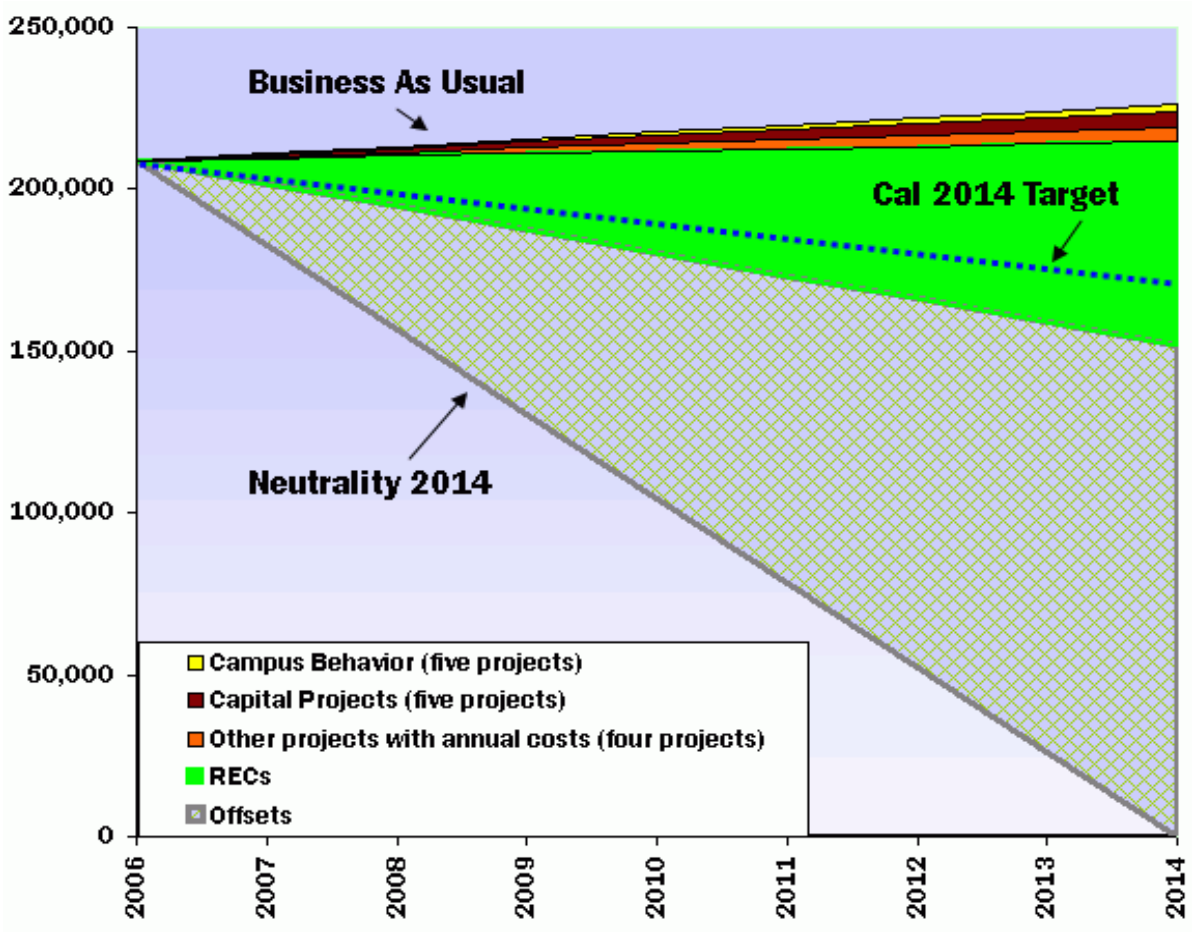
The College also reduced its projected annual greenhouse gas emissions by obtaining all of its electricity through a low-impact hydroelectric generator in Maine. Next year's emissions offset will thus be reduced by 22 percent, or about 450 tons.

To further reduce its carbon emissions, COA has conducted a comprehensive energy audit and has begun extensive work to improve energy efficiency in all buildings. Incandescent light bulbs have been replaced with compact fluorescent light bulbs where possible. Alternative commuting methods, such as carpooling and biking, have been promoted, as have flexible work plans so employees can work from home.

To determine how the college could best counteract the emissions that it can't avoid, students and staff have spent the past year intensively studying the carbon-offset market. The Climate Trust project chosen by the college will optimize traffic signals and manage traffic flow in Portland, Oregon, thereby reducing the amount of time cars spend idling at traffic lights in that city. The entire project is expected to reduce carbon dioxide emissions by more than 189,000 tons over five years, equivalent to taking more than 34,000 cars off the road for a year. Even better, it can serve as a model for emissions reductions in other cities.”

Example Two: University of California at Berkeley

The following graph illustrates the CalCAP team's analysis of their path to carbon neutrality, quantifying how much can be achieved through the three strategies of 1. on campus avoidance and reduction projects; 2. purchasing renewable energy credits (RECs) and 3. purchasing offsets.



To reach the 2014 target requires the purchase of significant RECs, and to become carbon neutral requires a massive investment in offsets.

In their carbon neutral scenario, UC Berkeley campus projects aimed at energy conservation made a very minor contribution to becoming carbon neutral, about 5% by 2014. As the report states "The identified energy reduction projects were not nearly as effective in reducing emissions as we had expected " (CalCAP, p. 38-39). In part this may be due to the fact that the UC Berkeley has made the ecoefficiency changes already: they have already picked the low hanging fruit.

But this case presents a rather sobering analysis of the route toward carbon neutrality, even more sobering if we add the full carbon footprint of 482,000 metric tons of CO2 equivalent. The graph only reflects the campus Emissions Inventory of about 209,000 metric tons of CO2 equivalent, and even in this limited frame almost two-thirds of their progress toward carbon neutrality would rely on choosing the right offsets.

Institutions vary in the gains to be made in each of these three areas. And there is not much data on the mix and impact of strategies to which each institution is committed, i.e., how much each campus reduction of GHGs each campus expects from the three categories of 1.campus-based projects, 2. purchasing or generating renewable energy, and 3. purchasing offsets.

D. Role of offsets in Climate Action Plans

The ACUPCC task force on offsets asks, "What types of carbon offsets count toward achieving carbon neutrality?" They answer, "Since there is currently no established certification system for carbon offsets, the program has not adopted any specifications for what type of offsets count. As certification systems for offsets and other greenhouse gas products develop, we will consider the adoption of standards for offsets…In general, buying carbon offsets to achieve climate neutrality should only be done as a last resort. A primary reason for this is economic, because unlike most emissions reduction actions that can provide a financial return on investment over the short- and/or long-term, when an individual actor, like a university, buys carbon offsets it is a one-time cost that has no direct or immediate return." (Investing in Carbon Offsets: Guidelines for ACUPCC Institutions, 2008, p.8)

Point 4, Section I of the ACUPCC draft Offset Protocol states that the primary responsibility of each signatory institution is to act directly to reduce their own internal GHG emissions on campus. Likewise, the ACUPCC Implementation Guide states: In general, signatories are encouraged to invest in on-campus emissions reductions before purchasing offsets, especially in the early stages when 'low hanging fruit' (i.e. relatively easy reductions with high returns on investment) are available (ibid.)

Offsets are quite problematic, both because they allow an institution to claim to be carbon neutral while still emitting many GHGs, and because it is difficult to identify real and additional offsets. "The Carbon Neutral Myth," a lengthy study by the Transnational Institute in The Netherlands, highlights the many ways that purchasing offsets as an approach to becoming climate neutral is fundamentally flawed. They critique most offset schemes as failing to challenge existing (over)consumption patterns and as unable to actually prevent or remove the level of GHG emissions they promise. Some of the major points in their case against offsets are:

1. "Offset companies are selling 'peace of mind' to consumers where none should exist as regards climate change, and this breeds complacency.

2. Some of the most polluting companies (and politicians) are using offsets as a cheap form of greenwash, as a distraction from their inherently unsustainable practices and their refusal to take more serious action on climate change.

3. Our knowledge of the carbon cycle is so limited that it is impossible to say whether plantations even have a net positive benefit in terms of mitigating climate change, let alone exactly quantifying this supposed benefit into a sellable commodity.

4. It is impossible to accurately determine a hypothetical baseline of what would have happened if the project had not taken place that would enable one to calculate how many sellable credits have been generated.

5. Projects that look great on the website or in the leaflet are often, in practice, mismanaged, ineffective or detrimental to the local communities who have to endure them.

6. The media and certain celebrities have been complicit in promoting an analysis of climate change that puts all the focus on individual lifestyles and draws attention away from the wider, systematic changes that need to be made in our societies and economies."

   (The Carbon Neutral Myth: Offset Indulgences for your Climate Sins, Carbon Trade Watch, 2007, p. 54)

Appendix C provides an overview of offsets provided by "the Gold Standard" a European offset evaluator, and the guidelines developed by ACUPCC's working group on offsets. Both attempt to deal with these critiques. Like the slowly evolving consensus on the reality and extent of human induced climate change, the criteria for identifying real/additional offsets is also developing. The ACUPCC Implementation Guide (p.27) makes the following positive observation on offsets,

> "A common objection to offsetting is that it does not actually reduce an institution's baseline. However, offsetting does provide an additional financial incentive for reducing one's own baseline. Therefore, while a heavy reliance, solely on offsets is not suggested, incorporating offsets into Climate Action Plans from the start is available as one component of a strategic plan for climate neutrality."

PART THREE: RECOMMENDATIONS FOR FLORIDA GULF COAST UNIVERSITY

A. While using the Clean Air-Cool Planet emissions inventory to define greenhouse gas reduction targets, keep focused on the larger embodied emissions/sustainability context.

Like other ACUPCC signatories, FGCU is using the Clean Air-Cool Planet emissions inventory to measure its progress toward carbon neutrality. This creates comparable goals and measures with other institutions. As the ACUPCC guidelines suggest, and the UC Berkeley example illustrates, any institution's carbon footprint is much larger than the Clean Air-Cool Planet Campus Carbon Calculator measures. It is important for the campus community to understand the impact it is has in this larger lifecycle context.(A lifecycle analysis includes greenhouse gas emissions from all stages of a product or service's lifecycle, including mining, manufacturing, transportation, retail, use, and disposal.) FGCU, like the CalCAP study, should also inventory emissions based on lifecycle analysis for emissions sources such as purchased electricity, university procurement (accounting for goods, services and food procured by the university), and construction activities (accounting for emissions from facilities, goods, and services required for construction). Using such a lifecycle analysis makes changes in purchasing and consumption an important part of a carbon reduction plan.

B. Create a climate neutral plan that maximizes conservation, sustainable consumption, and renewable energy. Pick a target date and milestones that enable: 1. the full implementation of on-campus conservation, 2. the choice of the best renewable energy credits, and 3. minimization of the use of offsets. Choose offsets, if necessary, that are real, additional, and local.

FGCU, like many campuses, is on a growth trajectory, and on many indicators (e.g. square footage of campus housing per student, number of electricity-powered devices used by faculty, staff and students, air travel miles, commuting) campus energy consumption is likely to increase (and so are GHG emissions as a result). It is very difficult to create a sustainable campus in an unsustainable economy.

The exercise in the epilogue below is designed to assist the FGCU campus community in analyzing the potential contribution of various campus-based projects in reducing GHG emissions. How much will building green buildings and purchasing energy efficient appliances reduce FGCU's carbon footprint? What other conservation measures are possible, such as using compact fluorescent light bulbs, setting thermostats higher during the cooling season, installing motion sensors for efficient lighting, educating students (and others) to turn off lights, computers, and so on. Since commuting contributes 32% of GHGs, major reductions are possible by significantly reducing the number of individuals who drive (alone) to campus. But given the state of public transportation, how feasible is this?

The solar farm will reduce GHG emissions by about 12%. Are there other renewable sources of electricity available to be directly purchased and/or are there good renewable energy credits

available? What percentage of FGCU's purchased electricity can realistically come from these sources based on availability and cost?

Any college or university which claims to be carbon neutral today (like COA) or seeks to become so in the near future will need to rely heavily on carbon offsets, even if its definition of carbon neutrality excludes all indirect, embodied emissions (which it shouldn't.) Therefore making offsets a last resort, then choosing very carefully (ideally locally) should be a major focus of FGCU's strategy. Creating the right committee(s) to look carefully at cost-effective conservation (and reinvestment), authentic offsets, and renewable energy credits is a major priority for a solid carbon neutral plan.

The target date and timeline for becoming carbon neutral is best set by basing it on the contributions of these various actions. If on-campus conservation makes a large reduction, if quality, affordable renewable energy sources are available, and if good local offsets are identified, the target date can be set much sooner than if one or more of these conditions are not obtained.

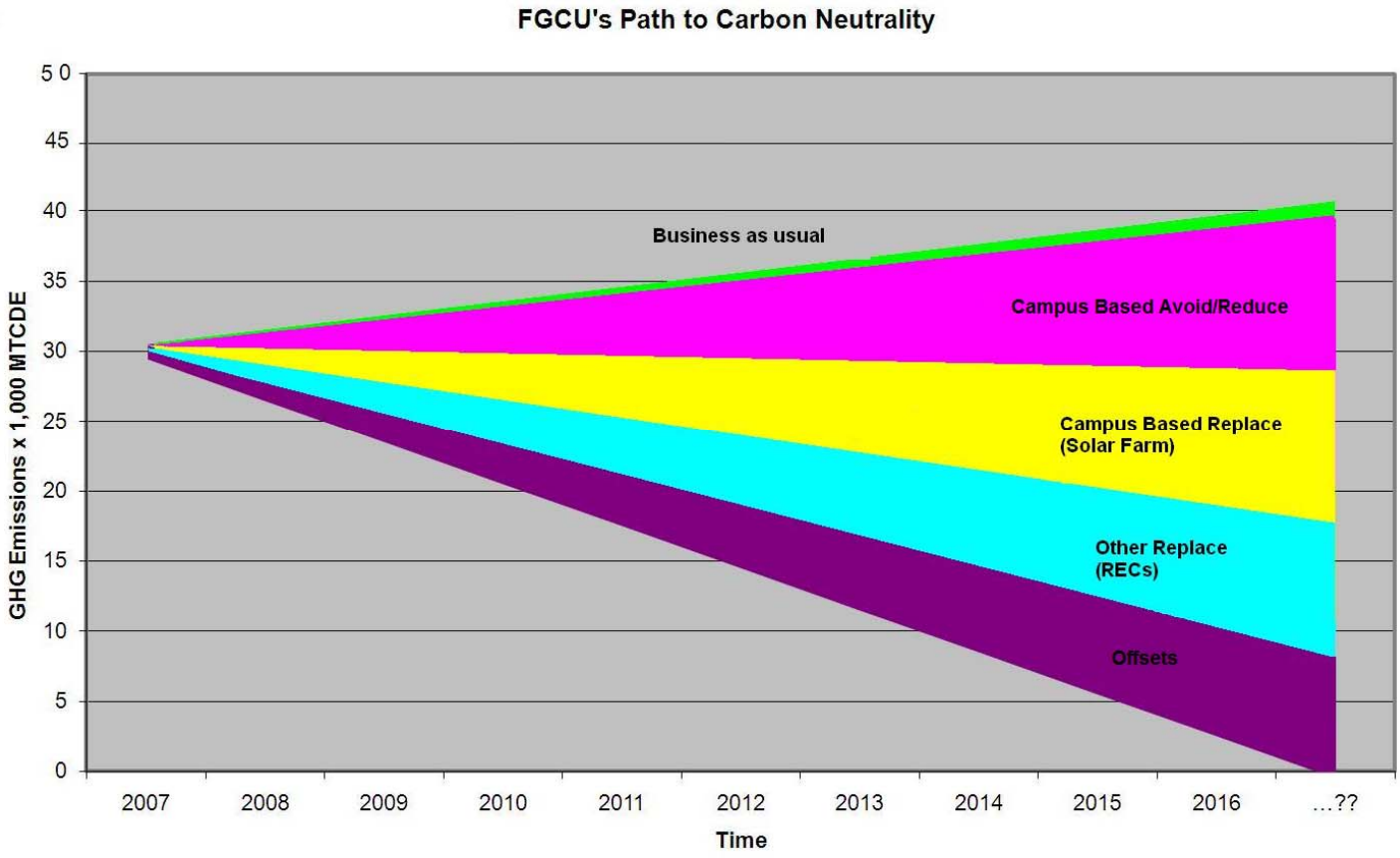
C. Ensure that on campus climate change education and public relations efforts regarding carbon neutrality are comprehensive and authentic.

Claims of carbon neutrality are suspect, especially if the institution factors in both embodied emissions (through life cycle analysis) of all products and services used by the campus community and the limits of offsets, however carefully chosen. FGCU has a long track record of including environmental and sustainability education within its curriculum and in focusing on its founding commitment to environmental sustainability in campus planning. FGCU is well positioned to utilize the larger sustainability context and the dilemmas of the inventory and offsets to engage the campus community, and the wider ACUPCC community, in the deep dialogue on personal lifestyle choices and public policy advocacy to support carbon neutrality. FGCU should explore options for educational workshops and curricula focused on climate change/climate neutrality which integrates leading edge thinking on these topics, utilizes the Earth Charter as an integrating framework, and emphasizes policy and lifestyle shifts for sustainable ways of living.

EPILOGUE: AN EXERCISE IN CHARTING FGCU'S PATH TO CARBON NEUTRALITY

The following is an exercise in determining the likely contribution of various strategies in achieving carbon neutrality, which will also assist in establishing a target date and milestones for this journey.

The figure below projects a hypothetical path to carbon neutrality for FGCU emphasizing the four activities of the carbon management hierarchy.



This figure is designed to pose a set of critical questions which must be answered to design FGCU's carbon neutral plan:

1. What are projected "business as usual" emissions? Given that FGCU's enrollment will continue to grow, more buildings will be built, etc., what would be the likely increase in GHG emissions without implementing the avoidance, reduction replacement and offset components of a carbon management plan?

2. What is the total carbon footprint of FGCU when all embodied emissions are included?

3. What is the likely contribution of the various carbon reduction strategies that FGCU could take to pursue carbon neutrality, especially given that 96% of FGCU's GHG emissions come from two sources: purchased electricity (64%) and commuting (32%).

The x axis measures total GHG emissions (29,600 MTCDE for 2008 in the CA-CP Campus Carbon Calculator inventory). The extension of the x axis from 29,600 to 50,000 at the top represents a conjecture of the full lifecycle carbon emissions associated with electricity generation and campus activities such as procurement (university purchases including office supplies, furniture, food) and construction.

The "business as usual" wedge represents an estimate of the growth of FGCU's GHG emissions over time. As enrollment increases and infrastructure is added, emissions will increase significantly. (The largest universities have the largest carbon footprints, and a better comparative measure is emissions per student or per square foot, as discussed earlier). However carbon neutrality means no net emissions, regardless of the institution's growth trajectory.

The first reduction wedge is campus-based projects which avoid and reduce GHG emissions. The three tangible actions that FGCU has taken as part of the ACUPCC, focused on green buildings, increasing use of public transportation, and purchasing energy efficient appliances, fit into this wedge. In addition to green building and energy star appliances, other on campus projects that conserve electricity consumption can significantly reduce GHG emissions, such as using compact fluorescent light bulbs, setting thermostats higher during the cool season, installing motion sensors for efficient lighting, educating students (and others) to turn off lights, computers, and so on. This depends on the institution's conservation history. In the case of UC Berkeley relatively little could be done to lower emissions with new on campus projects, since most "low hanging fruit" had been picked. Major reductions in GHGs are also possible by significantly reducing the number of individuals who drive (alone) to campus. Accurate estimates of the likely contribution of these various conservation initiatives are a critical first step.

The second reduction wedge is replacing high-carbon energy sources with low-carbon energy sources. The solar farm is an on campus renewable energy project that will provide 20% of FGCU's electricity (reducing GHG emissions about 12%). Purchasing renewable energy credits (RECs) can help replace the other 80%. Shifting the university fleet to biofuels would be another reduction strategy. The third wedge represents these reductions. An important issue here is the availability, the reliability and quality, and the price of RECs.

The fourth and last wedge is offsets, which hopefully is small. If it is large, FGCU should consider extending the timeline for becoming carbon neutral further into the future. If offsets are chosen they must be carefully evaluated with an emphasis on local offsets.

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APPENDIX A: UNDERSTANDING OFFSETS, FROM THE GOLD STANDARD WEBSITE

http://www.cdmgoldstandard.org/

When we talk about carbon emissions, what does that mean?

Greenhouse gases are released into the atmosphere by literally every activity in the civilized world. Making a cup of coffee includes the energy to grow the beans, process them and transport them to the supermarket, and then grind and filter them in your home. All of these activities cause greenhouse gas emissions – in industry jargon, we call them carbon emissions.

What is a carbon offset?

Avoiding the release of carbon into the atmosphere in one location by implementing an emissions reduction project in another location is known as offsetting. Emissions reductions projects can take many forms, but Gold Standard only includes renewable energy and energy efficiency projects.

A carbon offset is a net reduction in carbon emissions because the avoidance of one tonne of CO2 released negates the effect of one tonne of carbon released somewhere else. Gold Standard carbon offsets are generated by renewable energy and energy efficiency projects that avoid the release of CO2 or other greenhouse gasses in other places.

What does additionality mean?

Additionality is the industry term for "going beyond business as usual." This is the defining concept of carbon offset projects; to qualify as an offset, the reductions achieved by a project need to be additional to what would have happened if the project had not been carried out. For example, a government plans to build 10,000 houses with regular insulation and natural gas water heaters. By installing more costly solar water heaters and better insulation, a project developer can reduce emissions through renewable energy and energy efficiency – thus generating carbon credits. The fact that the outlook to generate additional revenue from carbon credits justifies choosing other than the more economically viable course of action makes the project additional.

Additionality can also be achieved by the fact that an activity generating revenue from carbon helps overcome certain barriers – for example, a wind park can be economically attractive, but because the technology is not as familiar as coal-fired power plants, the latter would normally be built. Choosing to build the wind park is therefore additional.

Why does additionality matter?

If a project is not additional, a company could receive credit for simply carrying out a project that would have occurred as part of the business-as-usual scenario. The credits would be worthless and the offsetter would have a false sense of helping the environment.

For example, a project designer in Iowa decides to produce a wind farm instead of relying on the commonly used coal-fired power plant for providing energy to the local industrial park. This is certainly a good initiative, but the project is only additional if the project developer has other options (i.e. he could go with the coal). If there is a law saying that all new plants must be wind, then the project is not additional and the money from carbon finance is not necessary.

In short, Carbon offset projects need to use the finance from the carbon market to go above and beyond business as usual. Gold Standard uses a clear and simple way to establish additionality, the UNFCCC additionality tool.

What is the UNFCCC Additionality Tool?

The UNFCCC Additionality Tool provides a step-by-step method for showing that a project goes beyond "business as usual" in terms of positive environmental impact. In the Gold Standard, all voluntary and compliance projects use the Additionality Tool.
UNFCCC Additionality Tool

Using the same additionality tool also provides clarity, transparency and sets a minimum standard allowing a comparison between credits. This is especially important in the voluntary market. Afterall, if a project is simply business as usual, the credit has dubious value. Gold Standard projects reduce risk.

What is the Clean Development Mechanism (CDM)?

Industrialized countries that decide to implement carbon offset projects in developing countries are utilizing something called the Clean Development Mechanism (CDM).

Although these projects are not ocurring in their own country, the project designers are choosing to contribute to a global net reduction of greenhouse gas emissions by supporting clean technologies in poorer countries, who may not have the funding or the capacity to do it themselves. The CDM is one of the so-called “flexible mechanisms” established by the Kyoto Protocol. The net reduction of greenhouse gases, via renewable energy and energy efficiency projects implemented by developed countries (such as the Netherlands) in developing countries (such as China), can be used for compliance purposes by developed countries to meet their legally binding Kyoto targets. These projects receive emissions credits, called Certified Emissions Reductions (CERs), which can be used for compliance purposes in domestic cap-and-trade schemes.

What is Joint Implementation?

Joint Implementation (JI) is similar to CDM, but implemented in developed countries with legally binding Kyoto reduction targets. (For example, the UK could implement a project in France).

What does cap-and-trade mean?

A cap can be thought of as a limit, or a ceiling. Countries that have agreed to reduce their greenhouse gas emissions under the Kyoto Protocol are legally bound to stay below their emissions limits – typically, these are the industrialised countries. They can do so by reducing emissions domestically, or by buying credits from other countries bound to stay below their assigned cap (this is called International Emissions Trading, and the currency traded are AAUs, Assigned Amount Units).

They can also invest in emission reduction projects in countries that have no cap (typically developing countries) and by that generate new emission reductions (CERs from the CDM). Another possibility for them is Joint Implementation (JI): They invest in projects reducing emissions in another country with a cap under the condition that the credits generated (ERUs, emission reduction units) are accounted as their own reduction and not of the host country.

The Kyoto protocol regulates trade between parties, or countries, only. Parties or several parties together are free to defer some of the responsibility to reduce emissions to their domestic actors, such as businesses. In this case, the countries set caps for their industry and allocate emission rights that businesses can trade between organisations. The largest mandatory cap-and-trade market to date is the European Union Emissions Trading Scheme (EU ETS).

If businesses know in advance that they risk spilling over their limit, they can arrange to buy emissions allowances from another organisation that has managed to stay under its emissions limit. A company that has stayed under its emissions limit can, in a sense, be rewarded for that good behavior by selling emissions allowances to another country further behind. Like countries, businesses can also invest in new emission reductions projects in developing countries.

Cap-and-trade schemes create a competitive way in which countries or businesses can actively work to reduce future GHG emissions in a vibrant market economy.

What are Certified Emissions Reductions (CERs)?

Certified Emissions Reductions (CERs) are emissions credits generated by CDM projects. Credits will be issued to projects that generate emissions reductions based on the concept of Additionality. These emissions reductions have to be verified by an authorized third party, called the Designated Operational Entity (DOE). 1 tonne of CO2equivalent = 1 CER.

What about other greenhouse emissions? Is it only carbon?

There are a number of gases which contribute to the so-called greenhouse effect. Greenhouse gas emissions include not only carbon dioxide (from burning fossil fuels), but also methane and nitrous oxide, among others.

They also count as emissions that need to be reduced, hence the term “CO2 equivalents”. Gases other than CO2 have a much greater global warming potential than CO2 (21 CO2e for methane, above 20,000 CO2e for SF6), but it is CO2 together with methane that accounts for the largest part of the global warming impact – hence the focus of the Gold Standard on fossil-fuel replacing projects.

ACUPCC Guidelines on Offsets

The ACUPCC Institutions have developed a set of guidelines that each will voluntarily apply to any investments in carbon offsets or participation in carbon markets they may undertake as part of their efforts to achieve GHG neutrality, and that will provide guidance for making investments and reducing the risks associated with those investments The guidelines are as follows:

1. Offset projects are real and emissions reductions are additional: Projects result in actual reductions of GHG emissions and would not have otherwise occurred under a reasonable and realistic business-as-usual scenario.

2. Offset projects are transparent: Project details (including project type, location, developer, duration, standard employed, etc.) are known to the institution and communicated to stakeholders in a transparent way to help ensure validity and further the goal of education on climate disruption and sustainability.

3. Emissions reductions are measurable: Projects result in measurable reductions of GHG emissions.

4. Emissions reductions are permanent: Projects result in permanent reductions of GHG emissions.

5. Emissions reductions are verified: Projects result in reductions of GHG emissions that have been verified by an independent third-party auditor that has been evaluated using the accompanying criteria.*

6. Offset projects are synchronous: Projects result in reductions of GHG emissions that take place during a distinct period of time that is reasonably close to the period of time during which the GHG emissions that are being offset took place.*

7. Offset projects account for leakage: Projects take into account any increases in direct or indirect GHG emissions that result from the project activity.

8. Credits are registered: Credits generated from project activities are registered with a well-regarded registry that has been evaluated using the accompanying criteria.*

9. Credits are not double-counted: Credits generated from project activities are not double-counted or claimed by any other party.*

10. Credits are retired: Credits are retired before they are claimed to offset an institution's annual greenhouse gas inventory, or a portion thereof.

(Protocol, v. 1,4)

[*] For more details and guidance on the characteristics of an "independent third-party auditor," a "reasonably close" time period, "a well-regarded registry," and strategies for ensuring against double counting, please see the accompanying document to this protocol: *Investing in Carbon Offsets: Guidelines for ACUPCC Institutions*.

APPENDIX B: YALE UNIVERSITY'S COMMITMENT

Yale is committed to a level of investment in energy conservation and alternate energy sources that will lead, based on current projections, to a reduction in its greenhouse gas emissions by 10% below our 1990 levels by the year 2020. This is consistent with a similar commitment by the Connecticut State Legislature and the New England Governors and Eastern Canadian Premiers Climate Action Plan.

By adopting this goal Yale is one of the first universities in the country to commit to a fifteen-year strategic energy plan. We intend to reach our goal through a combination of a strong energy conservation program, investing in alternative energy sources, purchasing Renewable Energy Certificates, and implementing on-site renewable and clean energy demonstration projects. Every one of us on campus has a role to play in helping achieve this goal, by conserving energy and by reducing the greenhouse gas emissions that flow from its use. Effective conservation programs can further free up funds within the University budget that will in turn be invested in renewable and non-CO2 emitting forms of energy. Specifically, we are setting out to achieve the following conservation targets:

15% reduction at residential colleges over a three-year period.
10% reduction at all other facilities
Two student groups, New Haven Action and the Student Task Force for Environmental Partnership, will take the lead in engaging and educating students on how to participate in advancing our goals for energy conservation. For every 5% of reduction at residential colleges the University will allocate renewable energy certificates to offset 1/3rd of the electrical energy used by residential colleges.

There will be a great deal of learning to be gained, both here at Yale and outside the campus community, on how to best meet our energy conservation and greenhouse gas reduction goals. We will share this learning internally and externally as it is gained in the months and years ahead.

To learn more about Yale's fifteen-year Greenhouse Gas Reduction and Renewable Energy strategic plan go to http://www.yale.edu/sustainability.

Sincerely,

Richard C. Levin, President
Andrew D. Hamilton, Provost
John E. Pepper, Vice President for Finance and Administration

APPENDIX C: THE PRINCETON REVIEW'S GREEN RATING CRITERIA AND HONOR ROLL

The Green Rating: How We Score Schools

The Green Rating was developed with you in mind. We assembled a panel of experts in higher education green practices to produce a survey for school administrators. The panel then selected key questions and weighted them for the rating. As with all our research, nearly all 4-year colleges and universities are invited to participate early in the year. We then produce the rating for each participating college based on their responses.

This rating, on a scale of 60-99, provides a comprehensive measure of a school's performance as an environmentally aware and prepared institution. Specifically, it includes 1.) whether students have a campus quality of life that is both healthy and sustainable, 2.) how well a school is preparing students for employment in the clean energy economy of the 21st century as well as for citizenship in a world now defined by environmental concerns and opportunities and 3) how environmentally responsible a school's policies are.

We asked all the schools we annually collect data from to answer questions about their efforts to provide (and continually develop) an environmentally beneficial student experience. The questions were created in consultation with ecoAmerica, a research and partnership-based environmental nonprofit that convened an expert committee to design this comprehensive ranking system. Questions it covers include:

What is the percentage of food expenditures that go toward local, organic or otherwise environmentally preferable food?

> "Purchasing local and especially local organic food provides healthier dining options for students, local economic support and reduced global warming and pesticide pollution. And it's just one example of how what's good for you is good for the community and the planet."

Does the school offer programs including free bus passes, universal access transit passes, bike sharing/renting, car sharing, carpool parking, vanpooling or guaranteed rides home to encourage alternatives to single-passenger automobile use for students?

> "It's simple: Do you want to go to a school that forces you to drive everywhere and spend twenty minutes looking for a parking spot in hazy air or somewhere that makes it easy for you to get around and enjoy a clean campus without the hassle and cost of a car? By providing public or shared transportation that increases access, schools can improve the college experience while reducing pollution."

Does the school have a formal committee with participation from students that is devoted to advancing sustainability on campus?

> "Opportunities for involvement in key school decisions mean that you can both improve school quality of life and get valuable experience for your career. Even if you're not on the committee, you and your peers can get involved in the student groups that participate in the process and have a voice. And schools with an inclusive approach, with participation from administration to faculty and staff to students, ensure more dynamic, long-lasting solutions."

Are new buildings are required to be LEED Silver certified or comparable?

> "Building according to high LEED standards means more fresh air, natural light and fewer toxics. Studies show improved health, better classroom experience and reduced energy costs over the long term. The LEED rating program provides a credible, respected measure of building energy efficiency and environmental design for schools to build sustainable structures."

What is a school's overall waste diversion rate?

> "It boils down to this question: piles of trash outside the dorm and dining hall or less waste and lots of easy recycling bins? A waste diversion rate measures both reduction in waste output and a school's rate of recycling."

Does the school have an environmental studies major, minor or concentration?

> "Students want to get good jobs and lead responsible lives, lives that make a positive difference for society. To do that, undergrads need access to environmental studies courses that provide an understanding of how the global ecosystem works and prepare you for future opportunities. Even if you don't major in environmental studies, a school's commitment to the field means you have more course options to ensure you get the background you need."

Does the school have an 'environmental literacy' requirement?

> "Environmental literacy is becoming a core necessity, regardless of career of interest, as companies are increasingly asking employees to consider the bigger picture. Working as an economist or in the business sector? You'll need to look at the price of carbon. Entering the computer science field? You'll have to think about reducing energy use. Designing buildings? Know the wood that has the least environmental impact and think about where the trash goes."

Has the school produced a publicly available greenhouse gas emissions inventory and adopted a climate action plan consistent with 80% greenhouse gas reductions by 2050 targets?

> "Climate change will affect every aspect of our lives. Leading climate scientists say that a minimum of 80% reductions in carbon emissions mid-century will be necessary to avert the worst impacts of climate change. A school that has an inventory and a plan is not only

taking responsible action, it is more likely to have the experience to deliver the training you need for your life and your career."

What percentage of the school's energy consumption, including heating/cooling and electrical, is derived from renewable resources (this definition included 'green tags' but not nuclear or large scale hydro power)?

"No school will be able to reduce its energy consumption to zero. But every university can make sure that the energy they do use is healthier for students and the planet by being clean and renewable. So in addition to efficiency improvements and conservation efforts that cut energy use, campuses should make sure the remaining power they do use comes from renewable sources."

Does the school employ a dedicated full-time (or full-time equivalent) sustainability officer?

"Ensuring a school is healthy for students and for the planet takes focused and continuous attention. Schools that are serious and sincere about sustainability simply can't succeed without hiring professionals to coordinate campus-wide efforts that improve the student experience."

Colleges that did not supply answers to a sufficient number of the questions for us to fairly compare them to other schools receive a Green Rating of 60*. The schools have an opportunity to update their sustainability data every year and will have their ratings re-calculated and published annually.

All italicized quotations are from Jared Duval, Senior Fellow for ecoAmerica and former National Director of the Sierra Student Coalition.

Green Rating Honor Roll

Arizona State University at the Tempe campus 	At Arizona State University (ASU) sustainability is a fundamental precept underlying its teaching, learning, research, and business missions. Established in 2007, ASU's School of Sustainability, the first of its kind in the U.S., offers transdisciplinary degree programs that advance practical solutions to environmental, economic, and social challenges. The school has over 60 faculty representing over 40 disciplines and offers undergraduate and graduate degree programs along with a professional certificate. ASU 101 became a required course for incoming freshman beginning in fall 2007; this course contains five modules, one of which is focused on sustainability.

Bates College (Lewiston, ME) 	From the 28% of its food budget dedicated to local, natural, and organic purchases to the bicycles and cars they share to reduce pollution, environmental sustainability is part of Bates College's DNA. Former U.S. Senator and Secretary of State Ed Muskie, a 1936 Bates graduate, authored landmark environmental legislation including the national Clean Air, Clean Water, and Resource Recovery Acts. In the past year, Bates has opened two new major buildings, a student residence hall and dining commons, both built to LEED-Silver equivalence. Also last year, Bates became the first Maine institution to partner with Zipcar, securing two Toyota Priuses for car sharing by students, faculty, and staff. (Each Zipcar is estimated to reduce the need for 14 cars on campus.)
College of the Atlantic (Bar Harbor, ME) 	College of the Atlantic (COA) was founded with the mission of understanding the relationship between humans and our environment. From its first day of classes in 1972, COA has practiced what it teaches, taking a leadership role in educating innovators to create a more sustainable, peaceful and just world. COA is now net-zero for carbon emissions. It has reduced and avoided any emissions it can; the rest is offset. All of COA's electricity comes from renewable hydropower; new buildings and some old are heated via renewable wood pellets. The new Kathryn W. Davis Student Residence Village has composting toilets, triple-paned windows, metered showers, grey water pre-heats, and construction that immediately reduces the heating load.
Emory University (Atlanta, GA) 	As part of Emory's Strategic Plan and its commitment to positive transformation in the world, sustainability was identified as a top priority of the university. Emory's vision is to develop a model for healthy living on campus that can translate to communities around the globe. Sustainability initiatives at Emory include: building "green" with all new buildings constructed to LEED standards (with an emphasis on energy and water conservation), integrating sustainability into the curriculum (including the longest-running faculty development programs in sustainability in the country), promoting alternative transportation with a shuttle fleet that is 100% alternatively fueled; recycling Emory's waste stream (65% by 2015), and providing local and sustainably-grown food.
Georgia Institute of Technology (Atlanta, GA)	Located in the heart of Atlanta, the Georgia Institute of Technology is leading the charge in the green policy, practice,

	and academic arena as evidenced by: • 21 endowed chairs and 23 research centers that include significant sustainability components • A goal that every student takes at least one of more than the 100 courses with a sustainability emphasis • Institutional environmental sustainability programs that embrace green cleaning, solid waste recycling, drought-tolerant vegetation, and storm water capture and reuse • A Sustainable Food Project encouraging environmentally responsible dining habits and the implementation of a "green" portal providing a central resource to inform, showcase, promote green behaviors, activities, initiatives and events within the Georgia Tech community.
Harvard College (Cambridge, MA) 	Harvard has the largest green campus organization in the world consisting of 24 full-time professional staff and 32 part-time student employees all working to assist the Harvard community in greening all areas of its campus. Harvard has committed to a 30% reduction of greenhouse gas emissions (below 2006 levels) by 2016. It has established a $12 million revolving green campus loan fund to provide interest free loans to anyone at Harvard that has a green campus project with a payback of 10 years or less. Since it's inception in 2001, over $12 million has been lent out to fund 180 projects (lighting, HVAC, heating, cooling and ventilation, behavioral change, insulation, onsite renewable energy etc.).
State University of New York at Binghamton 	Nearly 70% of Binghamton University's 900-acre campus is in its natural state. The core of this undeveloped land is officially designated the Nature Preserve, encompassing 182 acres of land which includes a 20 acre wetland. Binghamton uses this large, valuable resource for teaching and learning, research, ecology, arts, literature, and outdoor recreation. Binghamton University's goal is to design, construct, operate, and maintain all new buildings following guidelines set forth by the U.S. Green Building Council's LEED rating system. Since 2004, Binghamton has obtained LEED certification on two buildings and is in the process of applying for LEED Silver certification for a recently constructed building.
University of New Hampshire (Durham, NH)	The University of New Hampshire's University Office of Sustainability (UOS) is the oldest endowed sustainability program in higher education in the U.S. In January 2009 UNH will become the first university in the U.S. to use landfill gas as its primary (80–85%) energy

	source. The project, called EcoLine, will lower energy costs, provide energy security, and reduce the UNH Durham campus's greenhouse gas emissions an estimated 57% below 1990 levels. Responding to the need of farmers for scientific research to support organic dairy efforts, UNH is the first land grant university to have an organic dairy farm and education/research center.
University of Oregon (Eugene, OR) 	The University of Oregon (UO) has been an international leader in sustainability for more than two decades, offering more than 200 sustainability related courses. The law school's environmental and Natural Resources Program pioneered the nation's first academic curriculum in public interest environmental law. The business school has launched a Sustainable Supply Chain Management Center. The Associated Students of the University of Oregon spends ten percent of its annual $10 million budget on sustainability programs. This fall the university will host the first ever sustainability conference for Oregon's public universities, and UO annually hosts two international student conferences on sustainability.
University of Washington (Seattle, WA) 	The University of Washington (UW) is a signatory of the Presidents Climate Commitment, which is a pledge to develop policies and practices that are climate neutral. As part of that commitment all new campus buildings will meet at least the LEED Silver standard. The UW is a founding member of the Seattle Climate partnership, which requires the university to purchase power that is 100 renewable and also requires extensive measures of energy conservation. The UW's food services emphasize local organic foods and are working toward a zero-waste goal, composting postconsumer waste, and offering compostable dishware and to-go packaging.
Yale University (New Haven, CT) 	Yale University is reducing its greenhouse gas emissions by 43 percent below 1990 levels. It has achieved a 17 percent reduction in the first two years of its effort. Yale is using solar, wind, and geothermal energy produced on campus to reduce its dependence on fossil fuels. Yale has one co-generation power plant and is building a second to maximize fuel efficiency. Energy conservation measures include setting thermostats higher in summer and lower in winter, using biofuels in vehicles, and giving incentives to employees to live near campus or carpool. The

	new home of Yale's School of Forestry and Environmental Studies, a leader in green research and education, is a landmark in sustainable design.

APPENDIX D: AMERICAN COLLEGE & UNIVERSITY PRESIDENTS CLIMATE COMMITMENT

We, the undersigned presidents and chancellors of colleges and universities, are deeply concerned about the unprecedented scale and speed of global warming and its potential for large-scale, adverse health, social, economic and ecological effects. We recognize the scientific consensus that global warming is real and is largely being caused by humans. We further recognize the need to reduce the global emission of greenhouse gases by 80% by mid-century at the latest, in order to avert the worst impacts of global warming and to reestablish the more stable climatic conditions that have made human progress over the last 10,000 years possible. While we understand that there might be short-term challenges associated with this effort, we believe that there will be great short-, medium-, and long-term economic, health, social and environmental benefits, including achieving energy independence for the U.S. as quickly as possible.

We believe colleges and universities must exercise leadership in their communities and throughout society by modeling ways to minimize global warming emissions, and by providing the knowledge and the educated graduates to achieve climate neutrality. Campuses that address the climate challenge by reducing global warming emissions and by integrating sustainability into their curriculum will better serve their students and meet their social mandate to help create a thriving, ethical and civil society. These colleges and universities will be providing students with the knowledge and skills needed to address the critical, systemic challenges faced by the world in this new century and enable them to benefit from the economic opportunities that will arise as a result of solutions they develop.

We further believe that colleges and universities that exert leadership in addressing climate change will stabilize and reduce their long-term energy costs, attract excellent students and faculty, attract new sources of funding, and increase the support of alumni and local communities. Accordingly, we commit our institutions to taking the following steps in pursuit of climate neutrality:

1. Initiate the development of a comprehensive plan to achieve climate neutrality as soon as possible.

    a. Within two months of signing this document, create institutional structures to guide the development and implementation of the plan.

    b. Within one year of signing this document, complete a comprehensive inventory of all greenhouse gas emissions (including emissions from electricity, heating, commuting, and air travel) and update the inventory every other year thereafter.

    c. Within two years of signing this document, develop an institutional action plan for becoming climate neutral, which will include:

        i. A target date for achieving climate neutrality as soon as possible.

ii. Interim targets for goals and actions that will lead to climate neutrality.

iii. Actions to make climate neutrality and sustainability a part of the curriculum and other educational experience for all students.

iv. Actions to expand research or other efforts necessary to achieve climate neutrality.

v. Mechanisms for tracking progress on goals and actions.

2. Initiate two or more of the following tangible actions to reduce greenhouse gases while the more comprehensive plan is being developed.

a. Establish a policy that all new campus construction will be built to at least the U.S. Green Building Council's LEED Silver standard or equivalent.

b. Adopt an energy-efficient appliance purchasing policy requiring purchase of ENERGY STAR certified products in all areas for which such ratings exist.

c. Establish a policy of offsetting all greenhouse gas emissions generated by air travel paid for by our institution.

d. Encourage use of and provide access to public transportation for all faculty, staff, students and visitors at our institution

e. Within one year of signing this document, begin purchasing or producing at least 15% of our institution's electricity consumption from renewable sources.

f. Establish a policy or a committee that supports climate and sustainability shareholder proposals at companies where our institution's endowment is invested.

g. Participate in the Waste Minimization component of the national RecycleMania competition, and adopt 3 or more associated measures to reduce waste.

3. Make the action plan, inventory, and periodic progress reports publicly available by providing them to the Association for the Advancement of Sustainability in Higher Education (AASHE) for posting and dissemination.

In recognition of the need to build support for this effort among college and university administrations across America, we will encourage other presidents to join this effort and become signatories to this commitment.

Signed,

The Signatories of the American College & University Presidents Climate Commitment

APPENDIX E: CENTER FOR ENVIRONMENTAL AND SUSTAINABILITY EDUCATION MISSION PREAMBLE, MISSION STATEMENT, AND GOALS

Preamble

Ours is a unique historical moment. The scope and range of human impacts on the Earth are unprecedented. So, too, are the possibilities to build a secure basis for a sustainable and sustaining future (or world). Never has so much depended on our wisdom, foresight, and the quality of our thinking. Higher education has a strategic contribution to make helping to: rediscover ancient truths, create new ideas and equip, empower, and inspire the rising generation. These goals, in turn, require mobilizing the research, educational, and organizational resources of the university community. The Center, then, is designed to meet the challenges and opportunities of the 21st century boldly and creatively.

Mission

The Center for Environmental and Sustainability Education works toward realizing the dream of a sustainable and peaceful future for Earth through scholarship, education, and action. The Center advances understanding and achievement of the goals of environmental and sustainability education through innovative educational research methods, emergent eco-pedagogies, and educational philosophy and practice based on ethics of care and sustainability. The Center seeks to elevate the environmental mission of Florida Gulf Coast University and serve the university community, the local community of the Western Everglades and Barrier Islands, and the wider community of scholars.

Goals

I. To advance innovative educational research methodologies and pedagogies in environmental and sustainability education. This work will include developing methods for the assessment of sustainability, philosophical research, and curriculum and program development, and will take place in a variety of educational settings and geographical locations, ranging from local to global.

II. To educate for an ecologically literate citizenry and to advance civic engagement in the critical environmental issues of the Western Everglades and Barrier Islands. Key areas of emphasis will include ethics, activism, and the literary arts.

III. To provide professional development for educators in environmental education and education for sustainability. The priority audiences will include University administrators, faculty, and in-service and pre-service teachers.

IV. To provide opportunities for faculty, administrators, staff, and students from across the campus to engage in scholarly activity, teaching, and service related to environmental and sustainability education. The Center will cooperate with other FGCU Centers and Institutes to advance common interests and to achieve the University's environmental mission.