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## UCSB Climate Action Plan Deep Dive: Offsets

### Introduction

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The American College & University Presidents Climate Commitment was created in 2007, and since then over 650 schools have signed on and more than half have created Climate Action Plans in order to begin the process towards becoming carbon neutral<sup>1</sup>. UCSB is one of the many schools who have created Climate Action Plans, but in the 2014 edition there were only two pages of discussions on the purchasing of carbon offsets, meaning there was a very limited amount of analysis on the topic. According to class discussions, a growing carbon market, a recent opt-in to Cap-and-Trade compliance carbon offsets, and research on what other schools are doing about offsets, it has become clear that in the future, when no additional on campus emission reduction projects are financially viable, carbon offsets will need to be invested in. It is important to mention that purchasing offsets is not required, and UCSB can decide in the future whether the university wants to invest in them or not. UCSB has always been a leader in sustainability, yet many other universities across the national already have carbon offset initiatives or programs in effect, while we currently do not. Through my research on carbon offsets, I have identified both state regulation compliance guidelines and national voluntary offset guidelines that could be possibly implemented at UCSB in the future.

### Problem

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As of now UCSB doesn't have a plan for purchasing carbon offsets, but it seems like it will be inevitable in order for UCSB to meet its carbon neutrality goals. There is a Cap-and-Trade program in California under Assembly Bill 32, and UCSB voluntarily opted in in 2015<sup>2</sup>. Research needs to be done in order to establish specific guidelines for what defines a carbon offset for UCSB and what the appropriate set of guidelines should be which will be applicable in the near future as it seems unlikely that UCSB will meet its carbon neutrality goals through mitigation strategies alone. Some possible difficulties with carbon offsets are that the price of a ton of CO<sub>2</sub> varies, the university would be using student money to fund projects that are not on campus, and deciding what guidelines will best fit UCSB will require the consideration of offset projects for both compliance carbon markets and voluntary carbon markets.

### Solution

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I will be researching the best guidelines for carbon offset projects that work for UCSB's carbon neutrality goals, since we currently do not have any concrete criterion. Considering that UCSB is now subject to compliance offset protocols under AB 32, I will look into additional, voluntary offset projects that UCSB can invest in. I will do this by looking at what other universities have done and programs they have in place, and determine whether UCSB should invest in both the compliance carbon market and the voluntary carbon market, as there is more flexibility and leeway

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<sup>1</sup> "American College & University Presidents Climate Commitment." *EcoAmerica*. N.p., 28 Jan. 2013. Web. 01 Feb. 2016.

<sup>2</sup> McHale, David, and Jordan Sager. "Annual Utility and Energy Report." *UC Santa Barbara* (2014): 1-6. 2014. Web. 23 May 2016.

in offset projects within the voluntary market. I will also make a total of five recommendations I believe UCSB should consider when an official offset plan is created. This will include a time when I think offsets should be considered, which verifying agencies the offsets should be reported and verified to, what types of offsets should be invested in, the creation of a workgroup, and increased involvement from students.

## Offset Guidelines

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### American College and University President’s Climate Commitment (ACUPCC)

Once universities and colleges sign the commitment, they must start working to make their campus carbon neutral. Many campuses throughout the nation have considered the purchasing of carbon offsets, and ACUPCC has a set of voluntary offset guidelines that will help universities and colleges determine which types of offsets they think are the most credible. Below are the ten guidelines they have created

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
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
Emissions reductions are measurable	Projects result in measurable reductions of GHG emissions
Emissions reductions are permanent	Projects result in permanent reductions of GHG emissions
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
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
Offset projects account for leakage	Projects take into account any increases in direct or indirect GHG emissions that result from the project activity
Credits are registered	Credits generated from project activities are registered with a well-regarded registry that has been evaluated using the accompanying criteria

Credits are not double counted	Credits generated from project activities are not double counted or claimed by any other party
Credits are retired	Credits are retired before they are claimed to offset an institution's annual greenhouse gas inventory, or a portion thereof

Source: [ACUPCC Carbon Offset Protocol](#)

### Gold Standard

The Gold Standard was created by the World Wildlife Fund and other international organizations in 2003. It was constructed to support and verify the credibility of energy projects that were made under the United Nation's Clean Development Mechanism<sup>3</sup>. In order to acquire Gold Standard certification, the projects must meet the requirements and methodologies of the scope area which can be agriculture, water, energy, or afforestation/reforestation. Each scope has a different set of protocols, but the overall principles of the Gold Standard are outlined below.

1	Do no harm - complying with the UN Millennium Development Goals
2	Enhance sustainable development
3	Involve all relevant stakeholders
4	Deliver real GHG emission reductions
5	Be compliant with all relevant laws and Gold Standard principles
6	Be transparent
7	Be continually and regularly monitored, reported, and verified

Source: [The Gold Standard](#)

### Climate Action Reserve

The Climate Action Reserve is a carbon offset registry who has established high quality carbon offset standards. The Reserve has different protocols as to what requirements projects must meet for the following areas:

- Coal Mine Methane
- Forest
- Grassland
- Mexico Forest
- Mexico Landfill
- Organic Waste Composting
- Organic Waste Digestion
- Ozone Depleting Substances
- Rice Cultivation
- Urban Forest Management

<sup>3</sup> "Our Purpose." *Gold Standard*. 2015. Web. 16. Apr. 2016.

- Mexico Livestock
- Mexico Ozone Depleting Substances
- Nitric Acid Production
- Nitrogen Management
- Urban Tree Planting
- U.S. Landfill
- U.S. Livestock

Verified Carbon Standard

The Verified Carbon Standard is a voluntary offset certification program that ensures that offset projects are credible and that the emissions reductions that the projects are reporting are accurate. Projects are evaluated against sets of rules and regulations by the Standard, and if they have been approved, offset credits can be issued, which VCS calls Verified Carbon Units. There are different methodologies that are used to assess projects in different sectors including energy, industrial processing, construction, transport, waste, agriculture, forestry, mining, livestock and manure, wetlands, and grasslands<sup>4</sup>. The following is a set of principles all verified projects must meet.

1	All carbon offsets must be real
2	All carbon offsets must be independently verified
3	All carbon offsets must be measurable
4	All carbon offsets must be transparently traded
5	All carbon offsets must be permanent
6	All carbon offsets must be uniquely numbered
7	All carbon offsets must be additional
8	All carbon offsets must be conservatively estimated

California Air Resources Board’s (ARB) Offset Compliance Protocol Requirements

California’s Cap-and-Trade program was created to force businesses and industries to reduce their greenhouse gas emissions. In order to do this, emitting entities can reduce their emissions and trade their remaining allowances, or they can invest in offset projects. Compliance offsets, ones supported by ARB for cap and trade are cheaper than buying allowances from other entities, which means businesses favor investing in offset projects rather than buying a large amount of allowances<sup>5</sup>. The requirements all offset projects need to meet in order to count under the Cap and Trade program in California are on the following page.

<sup>4</sup> “Find a Methodology.” *Verified Carbon Standard*. N.p., n.d. Web. 20 May 2016.

<sup>5</sup> “The Role of Offsets in Cap-and-Trade.” (n.d.): n. pag. *California Air Resources Board*. 25 Feb. 2010. Web. 03 Mar. 2016.

Real	The GHG emissions reduction must be a direct reduction within a confined project boundary. Recycling activities would not be eligible for offset credit as the recycling activities do not have a direct GHG reduction at the recycling facility, but may have an emissions impact upstream when new materials are extracted or manufactured in lieu of the recycling. Currently, to avoid double counting issues in the Cap-and-Trade Program, ARB does not plan to adopt protocols that include a lifecycle analysis. The cap covers over 80% of California’s economy, so protocols are only approved for sectors or activities that are not covered by the cap
Permanent	The GHG emissions reduction must be permanent. For avoided GHG emissions, there must be no opportunity for a reversal of the avoided emissions. An example of this type of permanence is methane flaring in livestock digester projects, which permanently destroys methane. For GHG sequestration, the project must be able to ensure the GHG will not be released into the atmosphere for at least one hundred years. Both the U.S. Forest and Urban Forestry Projects Compliance Offset Protocols require a commitment to keep any credited carbon stocks sequestered for at least 100 years.
Quantifiable	The GHG emissions reduction must be conservatively quantified to ensure that only real reductions are credited. This requires a sound foundation and understanding of the underlying quantification for all sources, sinks, and reservoirs within a project boundary so that the net change from implementing the project represents a real reduction for issuing credit.
Verifiable and Enforceable	The GHG emissions reduction must be verifiable and enforceable. This requires a Compliance Offset Protocol to have clear monitoring and measurement requirements that can be audited by a verifier and enforced by ARB. (Lists can be found <a href="#">here</a> )
Additional	The GHG emissions reduction must be additional, or beyond any reduction required through regulation or action that would have otherwise occurred in a conservative <sup>3</sup> business-as-usual scenario. <sup>4</sup> In order for ARB to ensure offset credits are additional, ARB would not adopt a protocol for a project type that includes technology or GHG abatement practices that are already widely used. See section 4 for more information. If a specific GHG mitigation method is already required by regulation, any reductions from that mitigation method would not meet the requirements for additionality.

Source: [California Air Resources Board](#)

## Case Studies

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### Duke University

#### *Introduction*

This case study discusses the Duke University Carbon Offset Initiative and the role of carbon offsets within Duke University's plan for climate neutrality. This university has a climate neutrality goal of 2024, which is one year before the carbon neutrality goal for the University of California, Santa Barbara. The university has conducted an offset feasibility study, where they created a portfolio that examines all possible offsets for Duke University, including locally and internationally sourced offsets, but Duke University is more focused on local offset options that will benefit the neighboring community. Although not all of the offset projects that have been done at Duke University can be implemented at UCSB, it is helpful to look at how the projects worked and how they differentiated between compliance offsets and voluntary offsets.

#### *Background*

Duke University has been a leader in environmental stewardship and sustainability for some time now, and they, along with UCSB, are one of the many colleges and universities across the United States that have signed the American College and University Presidents Climate Commitment (ACUPCC). Since 2007 they have removed around 64,000 metric tons of greenhouse gas emissions, and plan on increasing their reduction rate through improved transportation and energy efficiency measures that are outlined in their Climate Action Plan.

In order for the university to meet its climate neutrality goal by 2024, they will need to offset around 185,000 tons of CO<sub>2</sub>e per year, and they believe this amount will decrease as the university moves off of coal and instead invests in renewable energy sources. Currently, The Duke Carbon Offsets Initiative is working on a methane capture project through animal waste management systems, community-based energy efficiency and solar projects, and carbon sequestration through forestry project and land conservation.

#### *Findings*

Their methane capture project is located at Loyd Ray Farms in Yadkin County, North Carolina, where they collect methane that is produced by the decomposition of hog waste and burn it to generate electricity to use on the farm. Methane is a greenhouse gas that is 21 times more potent than carbon dioxide, which allows their offsets to be quite high. To do this, they put the hog waste in an anaerobic digester, and the gas is collected in a high density polyethylene cover to power a microturbine which will generate electricity. The wastewater from the digester then flows into an open air basin where it is treated and is then used to irrigate. In the first year of operations, there was more biogas generated than what was expected; however, issues with the biogas cooling system hindered the production of electricity. There was also an issue with a low flow of biogas to the flare within the system, until the production team installed a blower to increase the flow of biogas. Nevertheless, the methane capture system has produced 40% of the total potential carbon offset reductions possible within the first year of operation<sup>6</sup>. According to the Duke Carbon Offsets Initiative 2015 Annual Report, so far the Loyd Ray Farms methane capture project has generated 321 megawatts hours of electricity through the onsite microturbine, and has generated 1,988

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<sup>6</sup> "Digester Systems for Animal Waste Solids – The Loyd Ray Farms Project." *Professional Engineers of North Carolina*. Gus Simmons, P.E. and Cavanaugh & Associates, P.A., 28 Dec. 2011. Web. 28 Apr. 2016.

carbon offsets<sup>7</sup>. Some stakeholders for this project are Duke Energy, Google, Cavanaugh, the United States Department of Agriculture, and North Carolina Division of Soil & Water Conservation.

The Employee Residential Energy Efficiency Pilot Program determines how energy efficiency can provide socioeconomic benefits to the community. By encouraging Duke University employees to improve energy efficiency in their homes, the university can use the energy conserved as carbon offsets. This is done by reducing the barriers employees have from doing so, which is a lack of information on energy efficiency, lack of trust of contractors, lack of access to low interest loans, and a lack of funding. Each participant received a free home energy assessment that showed them ways they could increase their energy efficiency. A BPI-certified contractor does this and then creates a report with the findings and recommendations for the home<sup>8</sup>. In 2012 the Duke Climate Offsets Initiative received funding for the Home Energy Affordability Loan Pilot Program. Since then Duke University has partnered with the Clinton Initiative, the Environmental Finance Center at UNC-Chapel Hill, the NC Cooperative Extension and NC State University, Duke University Federal Credit Union, Advanced Energy, ResiSpeak, and Duke Energy Smart\$aver.

The Duke Employee Solar Discount Project is similar to the Residential Energy Efficiency Pilot Project, but instead of energy efficiency the focus is on installing solar panels on residential homes. The same barriers exist for solar as for energy efficiency, and they have collaborated with Sanford School of Public Policy, Nicholas Institute for Environmental Policy Solutions, Bass Connections in Energy, Duke Environmental Law and Policy Clinic, UNC's Environmental Finance Center, Solarize Your Workplace, Yes! Solar Solutions, and Southern Energy Management<sup>9</sup>. This projects allows Duke employees to install solar panels at a 10-20% discount because they will be supporting the university's carbon neutrality goal. There have been some challenges with timing of the projects and the installation period of the panels in order to claim North Carolina state tax credit, but the program is working on making it easier. So far there have been 29 Duke employees that have installed solar on their homes for a total of 152 kilowatts of solar, and around 4,500 megawatt hours will be produced within the next 25 years<sup>10</sup>.

### *Discussion*

Carbon offsets for compliance are more expensive to invest in, but have higher credibility. This only constitutes a small portion of Duke University's offset plans, as they are not currently federally regulated under the cap and trade program. Along with compliance offsets, they have invested in voluntary carbon offsets for neutrality. Because Duke University is not required to invest in carbon offsets for compliance, they can take more risks with what they believe qualifies as an offset in the voluntary carbon market.

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<sup>7</sup> "Duke Carbon Offsets Initiative 2015 Annual Report." *Issuu*. Working Duke, 2015. Web. 06 June 2016.

<sup>8</sup> "Duke Employee Residential Energy Efficiency Pilot Program." *Duke Sustainability*. N.p., n.d. Web. 06 June 2016.

<sup>9</sup> "Duke Employee Solar Discount Pilot Program." *Duke Sustainability*. N.p., n.d. Web. 06 June 2016.

<sup>10</sup> "Duke Carbon Offsets Initiative 2015 Annual Report." *Issuu*. Working Duke, 2015. Web. 06 June 2016.

	Reduction	Sequestration	Avoided Emissions
<b>Offsets That May Be Eligible for Compliance and Voluntary Purposes</b>	<ul style="list-style-type: none"> <li>• Fertilizer and Nutrient Management</li> <li>• Methane Capture or Aerobic Decomposition (Livestock, Landfill, and Coal Mines)</li> <li>• Small Fossil Fuel Users' Reductions</li> <li>• U.S. Emission Allowances</li> <li>• Emission Allowances from the EU or other cap-and-trade systems</li> </ul>	<ul style="list-style-type: none"> <li>• Agricultural no-till, conservation tillage, or 'bio-char'</li> <li>• Afforestation &amp; Reforestation</li> <li>• Geo-sequestration of uncapped GHGs</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced &amp; Avoided Deforestation and Forest Degradation</li> </ul>
<b>Offsets Likely Eligible Only for Voluntary Purposes</b>	<ul style="list-style-type: none"> <li>• Industrial Fugitive GHGs</li> <li>• End-use Transportation Efficiency</li> <li>• Biofuels / Fuel Switching</li> <li>• Energy Efficiency</li> <li>• Small-Scale Renewable Energy</li> </ul>	---	<ul style="list-style-type: none"> <li>• Renewable Energy Credits (RECs) linked to avoided GHGs</li> <li>• Non-REC Renewable Energy</li> </ul>

Source: [\*The Role of Offsets in Meeting Duke University's Commitment to 'Climate Neutrality': A Feasibility Study - Duke University\*](#)

Above is a table of offsets that are likely to be counted for voluntary and compliance purposes, as well as just voluntary purposes. Duke University has invested in methane capture with Loyd Ray Farms, which is a compliance offset. Their other two energy efficiency programs are only eligible for voluntary offsets, which would not qualify as a compliance offset for UCSB as we are regulated under the federal cap and trade program. Duke university has done some research in forestry efforts, both forestry sequestration and avoided emissions, but no substantial projects have been completed so far. This is something UCSB could potentially look into, as UC Sedgwick Reserve could potentially be an area where these projects could be completed.

The study was very thorough and included information from a variety of other documents from Duke University. They have one of the most comprehensive offset initiatives in the nation, and I think it is wise for UCSB to take into consideration the research they have done for their campus and examine how we can use some of the same or similar projects. UCSB could potentially consider implementing both compliance offsets and voluntary offsets, just as Duke University has done, which would increase the amount of potential offset projects that can be invested in. The only complication is that private universities have more money to invest in offset projects, which means that UCSB should be careful and put a lot of thought and consideration into which projects will be invested in.



## American University

### *Introduction*

American University signed the American College and University Presidents' Climate Commitment eight years ago in 2008, and has pledged to become carbon neutral by 2020<sup>11</sup>. They have realized that they will not be able to completely eliminate all of their emissions, so they have conducted a report on possible offset projects the university can invest in so that AU can meet their carbon neutrality goals. The report analyzes a variety of offset projects, offset guidelines, and verification standards that the university should consider when thinking about what system and what projects should be invested in, which could be useful for when UCSB starts thinking about offsets.

### *Background*

The sustainability program at American University decided to participate in a offset program with a nonprofit organization in Costa Rica named Pax Natura<sup>12</sup>. The pilot program is called The Pax Natura Programmatic Project for the Payment for Environmental Service, which pays landowners for the forests that are on their land and for their carbon offsetting abilities. Due to lack of funding and the project's inability to be verified under any reputable carbon offset standard, the project remained in its pilot stage and no longer issues offsets.

Because the Pax Natura project is no longer a feasible option for American University to invest in in order to become carbon neutral, this report was created to explore other options for carbon offset programs that might be more suitable for the university's mission and goals. American University is not currently legally required to become carbon neutral, but it is a university goal and they pledged to do so with the ACUPCC. The university is part of the voluntary carbon market where they can purchase voluntary carbon offsets, which are not officially regulated but can be verified by agencies that ensure the quality of the offset projects their programs support.

### *Findings*

Scope 1 for AU involves direct emissions from campus activities. Scope 2 involves off campus emissions that are purchased by the university. The second largest source of emissions at American University is scope 3, emissions involving travel. Because the university has pledged to become more internationally involved, emissions due to travel have been considered unavoidable, so offset projects are being looked into.

The report was sectioned into many categories. It first analyzes critiques of the carbon market, where they discuss popular controversial opinions on the morality of carbon projects such as the commodification of nature, "buying your way out" of reducing emissions, or human rights violations. They also analyze technical issues with the carbon market, such as baseline inflation, or ensuring projects are additional and permanent. The second section of the report provides a summary of mandatory/compliance offset policies and standards that are implemented internationally and nationally, including the Regional Greenhouse Gas Initiative, The Western Climate Initiative, The Midwest GHG Reduction Accord and the California Cap-and-Trade

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<sup>11</sup> Baker, Nicolas, Ryan Borish, Jenifer Collins, Renee Ledoux, Giang Phan, Mark Siebenaler, Joe Thwaites, Evan Vaughan, Chris O'Brien, and Ken Conca. "Dude, Where's My Carbon?." *American University*. Practicum Group. 01 June 2016.

<sup>12</sup> Baker, Nicolas, Ryan Borish, Jenifer Collins, Renee Ledoux, Giang Phan, Mark Siebenaler, Joe Thwaites, Evan Vaughan, Chris O'Brien, and Ken Conca. "Dude, Where's My Carbon?." *American University*. Practicum Group. 01 June 2016.

Program. Next, AU analyzed the national and international voluntary offset market and different types of policies and standards that are used. Specifically, they looked into the Climate Action Reserve, Verified Carbon Standard, the Climate, Community, and Biodiversity Standards, the American Carbon Registry, and the Gold Standard. The future of the carbon market is evaluated, and then at the very end of the report is a case study of their pilot project with Pax Natura.

American University has concluded that if they were to be subject to a compliance market, they would have to pay for scope 1 and 2 emissions, but predict they will not have to buy offsets for scope 2 since they are already investing in renewable energy. Scope three would be in the voluntary market for offsets, so the price of offset emissions is much lower. Below is a table of the information summarized.

	Current Emissions	Likely Future Carbon Price	Price of Offsets
Scope 1	8,269.8 tons CO <sub>2</sub> e	\$45 USD	\$372,141 USD
Scope 2	19,399.6 tons CO <sub>2</sub> e	n/a	n/a
Scope 3	21,092.9 tons CO <sub>2</sub> e	\$18 USD	\$379,656 USD

*Source: Dude, Where's my Carbon? - American University*

The following recommendations were made on carbon offsets for American University based on the findings that were researched in the report:

1. Reduce emissions as much as possible first, and keep looking for ways of doing so
2. Use High Quality Offset Standards that combine strong carbon accounting procedures with positive co-benefits
3. If non-verified offsets are purchased, AU should take a highly localized hands-on approach to ensure quality
4. Invest in offset projects that broadly match the source of emissions
5. Be transparent about the uncertainties and limitations involved in offsetting and claiming carbon neutrality

### *Discussion*

The American University did an extremely thorough analysis of many types of offset verifying organizations, and researched a variety of compliance and voluntary carbon offset projects. The Pax Natura project AU invested in didn't end up being a project that would be able to offset their emissions, so the researchers looked into other possibilities for the future. Because UCSB is also looking at its options for carbon offsets, I think that the preliminary work and the comparisons of projects and organizations was helpful for UCSB. I think that the final recommendations that were made for AU took into account everything that was represented in the report, and I think UCSB should look at these closely as I think all should also be implemented except for recommendation 3. I believe that UCSB should only invest in offset projects that can be professionally verified to ensure its quality.

## University of Maryland

### *Introduction*

The Sustainability Council at the University of Maryland decided to explore carbon offset projects and programs that are already being implemented to see what options would work best for the university, so they created a Carbon Offset Work Group. The Work Group was created in 2014 with the goal of making the university a leader in creating a plan for offsets. The Work Group looked at offset programs that other universities have put into effect, local offset projects, global partnership offset projects, and how creating an offset plan will reinforce the university's leadership in sustainable efforts. UCSB is in the preliminary steps to creating a program or plan of its own, and looking at what the University of Maryland put together will help guide UCSB in the right direction

### *Background*

According to the university's Climate Action Plan, emissions must be reduced by 50% from 2005 levels by the year 2020. President Loh's Energy Initiatives, if all are implemented, will cut campus emissions by 30%, and the remaining amount would need to be offset. It is projected that in the year 2020, all remaining emissions will come from the combined heat and power plan, commuter vehicles, and air travel<sup>13</sup>.

The Work Group looked at the guidelines that UC Berkeley drafted for offset purchasing, which coincided with AB 32s requirements and also preferred California based offset projects. Offset projects that were more expensive were also preferred, since many qualify with Cap and Trade requirements, and livestock methane digester projects were advised against. Then the Work Group looked at the University of Florida, who has a Neutral Gator Project that has invested in many carbon offset projects, like the Revolving Tree Fund that plants trees and offset credits are given for the amount of CO<sub>2</sub> eliminated by each tree. Yale University has a fund to finance carbon offsets for individuals, groups, and even departments. The fund's calculator determines how many offset credits you need to purchase, and the individual's money then goes to the fund. Middlebury College has created an offset program, where they purchase offset credits through Native Energy that supports projects nationally and internationally. Duke University was also examined.

The Work Group also looked into local carbon offset projects, and realized that there are only a small amount of verified projects in Maryland. To solve this issue, the University of Maryland is looking into constructing their own verifiable projects that could be thought up by students for final thesis projects or could even be the goal of a small research class. At the same time, they are also considering purchasing offsets from local projects like The WGL CleanSteps Offset Program, FC Landfill Energy Facility, New Beulah Landfill, and a few other options.

Through partnerships and programs, the university creates projects regarding sustainability all around the world through Engineers without Borders and Alternative Breaks. If the university somehow is able to verify their projects, then they would also have access to the offsets their projects create. Since that is not being implemented now, they are looking at global carbon offset

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<sup>13</sup> Carbon Offset Work Group "Carbon Offset Work Group Report" University Sustainability Council. *University of Maryland*. Dec. 2015. 08 May 2016. "

projects that they can invest in with organizations like the Fair Climate Fund and The Carbon Neutral Company, who have projects with offset costs between \$2 and \$21 USD.

### *Findings*

After months of research and meetings with stakeholders, the following recommendations were made by the Work Group on carbon offsets for the University of Maryland:

#### 1. Focus on direct emissions reductions before offsets

The Work Group thinks that on campus projects that will reduce direct emissions should be prioritized. When on campus projects are no longer financially feasible and it is cheaper to invest in offset projects than create their own, then they will take a serious look at investing in offsets.

#### 2. Create a Greenhouse Gas Reduction Fund for on-campus and offset projects

The Fund would look into the most financially beneficial projects that the university could create or invest in to reduce campus emissions. If money is allocated to carbon offset projects, then the Fund would have to make sure the project aligned with the guidelines that are specified in recommendation 3.

#### 3. Create a carbon offset program

This program would select projects that match the university's educational mission, and would benefit the state of Maryland, strengthen international partnership, develop innovation and entrepreneurship opportunities, and create new research and education experiences. The program has five priorities, ranking from highest to lowest:

- Create projects in communities that are close to campus so that students are involved
- Purchase carbon offsets in the state of Maryland
- Purchase carbon offsets in developing countries
- Purchase carbon offsets in states represented by the Big Ten Conference institutions
- Seek most financially beneficial solutions to decrease university emissions

#### 4. Offset air travel emissions

The Work Group has recommended that when the university looks at carbon offsets, all projects will offset 100% of air travel emissions. Offsetting emissions from air travel would be voluntary until the year 2020, when it will become mandatory.

#### 5. Give commuters the option to offset their emissions

Emissions from commuting are recommended to not be required to offset. If individuals wish to offset their personal commuting emissions, then they can pay the Department of Transportation Services a fee when they purchase parking permits, and the money would go to developing or investing carbon offset projects in the transportation sector in Maryland.

#### 6. Find innovative ways to develop and support local offset projects

If the university creates partnerships with local businesses and organizations by sharing the cost of verifying carbon offset projects, the university could possibly gain offset credits from the projects it helped launch.

#### 7. Seek carbon offsets verified by Gold Standard or VCS and CCBS

Carbon offsets should be verified by the Gold Standard, the Verified Carbon Standard, and the Climate, Community, and Biodiversity Standards.

8. Explore the potential of developing offset projects to reduce the carbon intensity of power generation

If renewable energy projects are developed that generate offsets instead of Renewable Energy Credits, the university could use the offset credits to reach their goal of carbon neutrality.

According to Sally DeLeon, the Sustainability Project Manager with the Department of Environmental Safety, Sustainability and Risk at the University of Maryland, recommendations 1, 5, and 8 were approved, recommendation 6 was rejected, and recommendations 2, 3, 4, and 7 will be adjusted. In addition, the Sustainability Council came up with an additional recommendation, where the Office of Sustainability and University Marketing and Communications will work together to create an outreach and communication plan that will support the management and implementation of the carbon emission fee and the general process of purchasing offsets.

#### *Discussion*

The Carbon Offset Work Group created a detailed set of recommendations for the University of Maryland when considering purchasing offset credits. The purpose of my report is to look at what other universities around the nation are doing and recommending, and the amount of detail this report has is helpful. UCSB can take into consideration what the University of Maryland researched and recommended, as well as which ones were rejected or needed tweaking. This will be beneficial to when UCSB goes through the process of creating its own carbon offset program or guidelines.

### **Financial Assessment AND Greenhouse Gas savings**

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This assessment will address the costs of the compliance offset projects versus voluntary offset projects.

#### *Compliance Offset Projects*

Offset projects can only be issued offset credits under compliance protocol if CARB approves the projects. Currently, there are six different sets of protocols including U.S. Forest Projects, Urban Forest Projects, Livestock Projects, Ozone Depleting Substance Compliance Projects, Mine Methane Capture Projects, and Rice Cultivation Projects. Each project has its own set of protocols for what qualifications the projects must need in order to be approved by CARB and considered a verified offset project.

Companies and businesses that are covered by AB 32 Cap and Trade are allowed to use offset credits for no more than 8% of their allowances<sup>14</sup>. Because UCSB opted in to Cap and Trade, that means that if we ever meet the cap amount of emissions, which is currently 25,000 MTCO<sub>2e</sub>, we will have to purchase allowances and will only be able to offset our emissions by 8% each

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<sup>14</sup> *California Carbon Dashboard*. N.p., n.d. Web. 01 Apr. 2016.

compliance period<sup>15</sup>. UCSB does not currently emit more than this cap, so that means we can offset more than 8% of our emissions and we can still consider investing in voluntary offset projects.

CARB has a report of the amount of offset credits they have issued thus far, where they provide the numbers on how many projects have been approved<sup>16</sup>. Below I created a table with the information from CARB’s report of how many offset credits have been issued and how many projects have been approved, excluding urban forest projects and rice cultivation projects because as of now no credits have been issued.

	Ozone Depleting Substances Projects	Livestock Projects	U.S. Forest Projects	Mine Methane Capture Projects
Offset Credits Issued	5,153,131	688,682	14,791,335	280,667
Number of Projects	79	72	42	8

The price of carbon credits vary every year, which makes them hard to account for. On average, the price of a voluntary offset credit is around \$6 per MTCO<sub>2e</sub>, and the price of a compliance offset credit fluctuates between \$6 and \$12 per MTCO<sub>2e</sub><sup>17</sup>. According to the February 2016 Joint Auction #6 of the California Cap-and-Trade Program Summary of Auction Settlement Prices and Results, the advance auction settlement price of a compliance offset credit is \$12.73<sup>18</sup>.

I wanted to know the average monetary value of each offset project. I took the total amount of offset credits ARB approved from each section, divided it by the amount of projects in each section, then multiplied the average amount of credits by the current cost of one offset credit.

	Ozone Depleting Substances Project	Livestock Project	U.S. Forest Project	Mine Methane Capture Project
Average Amount of Offset Credits Given	65,229.51	9,565.03	352,174.64	35,083.38
Price of Offset Projects (USD)	830,371.66	121,762.83	4,483,183.17	446,611.43

<sup>15</sup> Hull, Dana. “13 Things to Know About California’s Cap-and-Trade Program.” *The San Jose Mercury News*. N.p., 22 Feb. 2013. Web. 14 May 2016.

<sup>16</sup> “ARB Offset Credits Issued.” *California Air Resources Board*. N.p., 25 May 2016. Web. 31 May 2016.

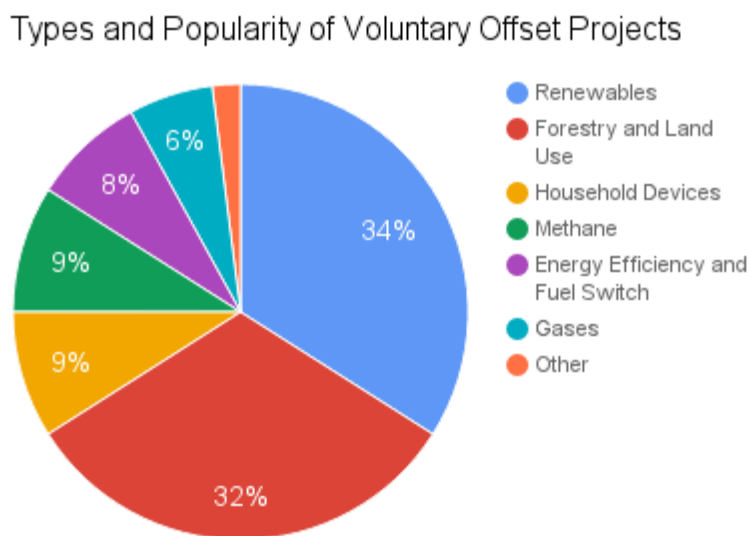
<sup>17</sup> Baker, Nicolas, Ryan Borish, Jenifer Collins, Renee Ledoux, Giang Phan, Mark Siebenaler, Joe Thwaites, Evan Vaughan, Chris O’Brien, and Ken Conca. “Dude, Where’s My Carbon?.” *American University*. Practicum Group. 01 June 2016.

<sup>18</sup> “California Cap-and-Trade Program Summary of Joint Auction Settlement Prices and Results.” *California Air Resources Board*. N.p., May 2016. Web. 03 June 2016.

Although there are the most ozone depleting substances projects, U.S. forest projects yield the highest amount of offset credits, and thus are worth the most money. If UCSB were to invest in offset projects under compliance regulations, I would suggest investing in U.S. forest projects as they have the highest amount of emissions reductions. Then, I would suggest investing in ozone depleting substances projects because it seems like those are the most popular to implement.

### *Voluntary Offset Projects*

Guidelines and rules for voluntary offset projects are much more flexible and can include many more types of projects compared to compliance offset projects. This is because under AB 32 Cap and Trade compliance project regulations, those industries regulated under the cap cannot have offset projects. According to Forest Trends, the voluntary carbon market has six primary categories of carbon offset projects, the biggest and most popular that is invested in is renewables.



*Source: Dude, Where’s My Carbon? – American University*

For the purposes of this report, I compared three offset projects from each of my case studies. The first one I wanted to analyze is from the University of Maryland, which is a New Beulah Landfill project, which is a landfill gas system where methane is collected and then destroyed<sup>19</sup>. It is a project that is located in Maryland, and according to the university’s offset recommendations, they prefer investing in offset projects that are local so that the benefits of decreased emissions will remain within the nearby community. The project has been in effect for eight years, and the average amount of offset credits issued is 15,224.88. This project is registered with the Climate Action Reserve.

<sup>19</sup> “Beulah Municipal Landfill (Dorchester County, MD).” *Climate Action Reserve*. N.p., 07 July 2016. Web. 28 June 2016. <<https://thereserve2.apx.com/mymodule/reg/prjView.asp?id1=411>>.

I then looked at Duke University's Loyd Ray Farms offset project, which involves an animal waste management system which destroys methane and creates renewable energy<sup>20</sup>. This offset project is in North Carolina, the same state that Duke University is in. The university wanted to invest in local offset projects for the same reason the University of Maryland did, so that the local community could reap the benefits of having cleaner air. This project has been running for a shorter amount of time, and the average amount of offset credits they generate annually is 694. This project is also registered with the Climate Action Reserve.

The final voluntary offset project I reviewed was more complicated and less straight-forward than the last two. The non profit organization the American University is purchasing offset credits from is Pax Natura, who works to preserve a forest area of 39,522 hectares in Costa Rica. The project has not been fully implemented because of the lack of funds and lack of landowners enrolled in the project. American University purchased 9,000 offset credits over the span of two years, which was the biggest amount of credits bought by one entity<sup>21</sup>. So on average, the university received 4,500 credits annually from the Pax Natura project. This project was not verified by the Verified Carbon Standards, as the project does not meet offset guidelines.

The offset projects from the University of Maryland and Duke University both involve methane emissions reductions. The project with the University of Maryland yielded a higher annual amount of offset credits, which in turn would be a more expensive project to invest in, but the project is local and benefits the community. I would recommend that if UCSB were to invest in voluntary carbon offsets, they should pick local landfill projects.

Currently, UCSB has no financial means to fund offsets, so the purchasing of offsets would be a last resort. On campus efforts like energy efficiency, renewable energy, green building, behavioral changes, and alternative transportation should be considered before investing in offsets. Offsets are the last solution to be considered because of the controversial reality of using student money for off campus projects, where students wouldn't necessarily see or feel involved in the reduction of GHG emissions. When offsets will needed to be purchased, it will be more cost efficient and the university will save money by investing in projects off campus rather than implementing more efforts on campus.

## **Feasibility for UCSB**

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### Landscape

There has been some discussion on the ethical implications of investing in offsets in other cities, states, or when countries. Many believe that offset project investments should be local, so that the surrounding community of UCSB will reap the benefits of reduced greenhouse gas emissions. Individuals can be less inclined to support the purchasing of offsets if they won't be able to see the benefits the offset projects create. One possible solution to this concern is to invest in local offset projects in low or middle income communities. But due to the nature of carbon offsets, there is no

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<sup>20</sup> "Duke Carbon Offsets Initiative – Loyd Ray Farms." *Climate Action Reserve*. N.p. 23 Sept. 2011. Web. 28 June 2016.  
< <https://thereserve2.apx.com/mymodule/reg/prjView.asp?id1=893>>.

<sup>21</sup> Baker, Nicolas, Ryan Borish, Jenifer Collins, Renee Ledoux, Giang Phan, Mark Siebenaler, Joe Thwaites, Evan Vaughan, Chris O'Brien, and Ken Conca. "Dude, Where's My Carbon?." *American University*. Practicum Group. 01 June 2016.



need to discuss the landscape implications these projects will have on the UCSB campus since they will all take place off campus.

### Politics

In addition to some individuals believing that offsets pose some environmental justice issues, others also think that it is just the ‘easy way out’. Some believe that investing in offset projects is just handing the burden off to someone else and that the university isn’t taking responsibility for its emissions. So instead of creating more projects on campus that reduce our carbon footprint, we just continue emitting the same amount we have and pay for the difference. This type of behavior is said to perpetuate our global consumption addiction, and instead of changing our lifestyles we just pay other industries or organizations to make positive environmental changes.

But in reality, the discussion of purchasing offsets comes into play when there are no other financially feasible options to reduce our emissions. Offsets are discussed when it will cost more to create emission reduction projects on campus than it would to invest in emission reduction projects elsewhere. Although UCSB wouldn’t be creating and taking credit for the offset projects, the institution itself will be a part of the larger goal of reducing global carbon emissions, no matter where the projects are.

The discussion of offsets could potentially motivate those opposed to them to create behavioral changes, ones that can be implemented on campus like using less energy, conserving water, or encouraging faculty and staff to bike to work in order to reduce emissions. Although those efforts combined wouldn’t generate the emissions reductions needed to propel UCSB to carbon neutrality, it could make students and staff on campus more comfortable with the idea of offsets.

### Education

UCSB would be expanding its leadership as an environmentally aware and creative campus by taking the initiative for creating a set of guidelines for offset purchasing. By doing this, the individuals working on creating this set of guidelines will learn about the carbon market, different offset guidelines and different off set reporting and verification systems. As the carbon market grows, this will become valuable knowledge. Creating a taskforce or working group could have the potential of creating new connections with other universities and organizations, and could open the door to creating new coalitions with local, national, and international companies that sell and verify offsets.

Carbon offsets are a difficult and complicated topic to discuss. With large amount of offset project operators, federal and state legislation, and verification and reporting systems, it is easy to get lost in the plethora of information. Through my research I was able to determine a small set of guidelines and verifying agencies that I think will be useful for when UCSB decides to implement offsets in their Climate Action Plan. The verifying agencies and the types of offsets I concluded were the most feasible for UCSB are outlined in the recommendations section below. I have gotten in touch with directors and managers that have already gone through the preliminary processes of establishing guidelines and I hope my research is helpful in the discussion and eventual determination of official UCSB carbon offset purchasing guidelines.

## Stakeholders

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Currently, there is no taskforce or committee dedicated to researching and discussing the possibilities of offsets at UCSB, and the creation of an initiative or program would need to be overseen by multiple people. At the moment, the individuals in charge of creating and developing the UCSB Climate Action Plan hold the power to create a taskforce of undergraduates, graduates, and professors to address the topic of offsets. These individuals would do the work and have the most say in what they believe is appropriate for UCSB to implement. The taskforce or committee can also include stakeholders who are affected by new campus policies or actions, and the following are a few I believe would be interested in what UCSB decides to do regarding offsets.

### Offset Project Registries and Verification agencies

Due to the large variety of offset verification programs, I only considered programs that will be most useful for UCSB. This includes the American Carbon Registry, the Climate Action Reserve, and the Verified Carbon Standard. I think these organizations will have an interest in what verification program UCSB will eventually adopt. This could mean positive reinforcement of their program, and if UCSB starts using it it is possible other UC schools within the system could use it as well in the future.

### American College & University Presidents Climate Commitment

UCSB signed onto the ACUPCC commitment years ago, and I think that the American College would be interested in how UCSB will meet its carbon neutrality goals with the help of carbon offsets. Over 600 schools have signed the climate commitment, and I think it will be useful for these schools to see what offset guidelines chooses to adopt, and possibly see if they can learn from our analysis of possible options.

### Faculty/students on UCSB Campus

Since carbon offsets will use money from students and faculty that could otherwise go to hiring new staff, building new infrastructure, or investing in other climate projects, I think these individuals will want to know exactly how UCSB came to the conclusion of what carbon offset guidelines and verification systems they will put in place. The guidelines and verification guidelines chosen will need to be approved by the students and staff at a later date, so I think it is important to keep them up to date with the progress of UCSB's involvement in carbon offsets. This could involve environmental economics faculty like [Paulina Oliva](#) and student affairs officer and internship director [Eric Zimmerman](#).

### Climate Registry

UCSB reports their carbon emissions to this registry, who designs voluntary and compliance greenhouse gas emission reporting programs. They focus on helping universities reduce their GHG emissions, and I think they would be interested in the steps UCSB is taking towards carbon neutrality.

### Environmental Student Organizations

I believe that environmental student organizations like the Environmental Affairs Board, California Student Sustainability Coalition, or Fossil Free UCSB will be interested in the work I am doing on carbon offsets because as environmentally conscious individuals, they will want to

make sure that the offset guidelines we adopt are thoroughly researched, analyzed, and thought through. I think organizations that focus on climate change and air pollution will be especially interested.

#### Universities I have reached out to

I have contacted the University of Maryland and Duke University to discuss their campus actions regarding offsets, and I think that they would be interested in what I have researched and learned. I also think that they would like to be updated on the progression of the discussion of offsets at UCSB and what the campus eventually decides to do regarding guidelines and verification systems.

### **Recommendation and Future Action Needed**

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Considering the research I have conducted on the differences between compliance and voluntary offsets, the approaches that other universities have taken, and the verifying reporting organizations I have looked at, I have created a set of five recommendations I think UCSB should act upon.

#### *1. Purchasing offset credits should be a last resort*

According to my research on Duke University, American University, and the University of Maryland, all three campuses decided to consider offsets when there are no other options. In UCSB's Climate Action Plan, it is stated that the campus will consider offset purchasing only when on campus emission reduction projects are no longer financially feasible. Only when purchasing offsets becomes more cost-effective than creating new emission reducing projects is when they should be considered.

#### *2. Verify and follow voluntary offsets with the Verified Carbon Standard or the Climate Action Reserve*

Both of these reporting agencies seem to be the most reputable and thorough, and most voluntary offset projects I looked into were verified by one of these. I also advise to only invest in offset projects that are verified by VCS or the Climate Action Reserve because they can also be used for compliance offset projects, since the California Air Resources Board uses these verifying and reporting agencies as well. But, when purchasing compliance offset project credits, UCSB must follow the guidelines and requirements of offset projects that the California ARB created.

#### *3. Invest in both compliance and voluntary offset projects*

UCSB should invest in voluntary offset projects that are verified by the VCS or the Climate Action Reserve. Because UCSB has a while until it reaches the capped amount of emissions allowed under Cap-and-Trade, UCSB should utilize voluntary offsets as much as possible as they are cheaper and there are more offset project options. ARB reviews potential offset protocols that can be added to the list of allowed projects under compliance regulation regularly, so some voluntary offsets could potentially become compliance offsets. In response to the research I have conducted, it seems like local landfill voluntary offset projects are the best bet because they are the more popular and generate a large amount of carbon offset credits.

Compliance offsets are cheaper than allowances under Cap-and-Trade, but are more expensive than voluntary offsets<sup>22</sup>. According to my research, If UCSB were to invest in offset projects under

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<sup>22</sup> "The Role of Offsets in Cap-and-Trade." (n.d.): n. pag. *California Air Resources Board*. 25 Feb. 2010. Web. 03 Mar. 2016.

compliance regulations, I would suggest investing in U.S. forest projects as they have the highest amount of emissions reductions. Then, I would suggest investing in ozone depleting substances projects because it seems like those are the most popular to implement. Compliance projects should be invested in because the credits granted are official, ensured, and trusted, but most of the offset credits UCSB is granted should come from voluntary projects.

#### *4. Create a carbon offset workgroup or committee*

UCSB has no designated individuals who work on developing carbon offset guidelines or a program for UCSB, which I believe is part of the reason why the university has no plan for the purchasing of offset credits. My research, along with the research done by Maximilian Stiefel, a graduate student, are the only in depth analysis of what UCSB should do regarding offsets. This can easily be changed if a committee or workgroup was created. The people in this group could do more research on any additional guidelines or projects other universities have done, and could potentially create a carbon offset program specifically for UCSB. This program could potentially become a UC-system wide program that all the UC should could implement. I would suggest creating this workgroup or committee as soon as possible, preferably within the next two years so that for the next Climate Action Plan update, there will be more information available.

#### *5. Involve students*

I believe that students that major or have an interest in environmental studies, geography, or economics would be interested in learning about UCSB's Climate Action Plan and what the campus plans on doing about carbon offsets. This would also be a way to gather input from the student body on their opinions on whether they would be okay with using student money to purchase offset credits. Involvement could be through emails, lectures, and informational meetings. These students could potentially brainstorm for ideas about local projects that can be invested in, or could also become part of the carbon offset workgroup or committee. Students could also become involved if a research class was made just for carbon offsets.