



Duke Carbon Offsets Initiative

Carbon Offset Bundling



**Duke Carbon
Offsets Initiative**
DUKE UNIVERSITY

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History

In 2007, Duke University signed the American College and University Presidents' Climate Commitment (ACUPCC) and set a target of achieving climate neutrality by 2024. After being aggressive with reducing emissions on campus, Duke will have to offset an estimated 185,000 metric tons per year of carbon dioxide in 2024. The Duke Carbon Offsets Initiative was created as a branch of Sustainable Duke to help Duke University reach climate neutrality. Since its beginning in 2009, it has developed a variety of innovative carbon offset programs in swine waste-to-energy, energy efficiency, solar, and urban forestry.

Vision

To make Duke University a model climate-neutral institution and to lead peer institutions in their efforts to become climate neutral.

Mission

- To meet Duke University's climate neutrality goal by 2024 by **developing and implementing the University's strategy** for identifying, creating, and purchasing carbon offsets.
- To implement the strategy in a way that **provides educational opportunities** for students, faculty, and staff.
- To **prioritize local, state, and regional offsets that provide significant environmental, economic, and societal co-benefits** that are beyond the benefits of greenhouse gas reduction.
- To **facilitate and catalyze high-integrity, unique offset projects** by serving as a resource for other institutions.

Offset Bundling

1 Introduction

1.1 Climate Action Now

Greenhouse gas emissions and associated climate change remain a pressing global problem. Without meaningful change, climate damages will continue to worsen, often putting the most vulnerable nations and communities at risk. As leaders in the community, colleges and universities are recognizing that immediate actions must occur to limit future risk. Despite the recognition of this pressing need for change, high marginal costs of abatement limit the scale of onsite emissions reduction, driving the role of carbon offsets in climate neutrality. Still, the research regarding offsets is new and many projects remain in their infancy, driving the need for a hybrid offset system that recognizes the importance of an immediate climate impact without sacrificing new research.

1.2 The Role of Academic Institutions

While some colleges and universities have taken the traditional path of developing projects that produce marketable 3rd party verified carbon offsets through existing registries, many continue to express interest in developing their own local and innovative carbon offset projects. Already, many institutions choose to forego 3rd party verification to decrease project costs and reduce the burden of ongoing project management. Recently, institutions have also voiced the desire to leverage their academic and research resources to develop innovative carbon offset projects – new project types that do not have recognized carbon offset protocols within existing voluntary registries.

These local, innovative projects provide schools with an array of co-benefits that are difficult to acquire through the purchase of 3rd party verified offsets from an existing project. Co-benefits are not limited to those listed in the image below, but rather represent any associated benefit of a project, outside of emissions reduction. Additional information can be seen in offset projects from various institutions represented on offsetnetwork.org.

Offset Project Co-Benefits



Education



Social



Environmental



Economic



Scalability



Public Relations
& Partnerships

1.3 Challenges to Innovative Projects

Given the tangibility and immediate attainment of these co-benefits, it is not surprising that some institutions are moving away from 3rd party verified projects to focus on local impact and innovation. Despite this transition, internally developed carbon offset projects provide a set of unique challenges that institutions must consider, including:

- Achieving emission reductions that meet all PAVER¹ requirements
 - Assuring permanence, when projects may have 20-25 year maturations that require recurring monitoring and maintenance.
 - Assuring additionality, that the emissions reduction is above and beyond Business-as-Usual (BAU), and the result of a project a university would not have pursued outside of meeting their climate goals.
- Latent time to project offset maturity and associated climate impact, such as urban forestry projects.
- Difficulty paying for “futures,” or getting projects off the ground with current costs and discounted future benefits.
- Imperfect data collection and uncertainty in the mitigation impact.
- Small scale of innovative projects may yield very few offsets.
- Lack of ecosystem services markets for co-benefits.

For many internally developed projects, it may be impossible to address all of these challenges. In some circumstances, this can result in reversals, leakages, or fewer than expected carbon offsets. For institutions relying on these projects to have an immediate, measurable climate impact and provide GHG reductions to become climate neutral, these projects pose a significant risk. Offset bundling aims to reduce these risks.

2 What is Bundling?

Bundling is a carbon offset strategy designed to decrease risk, improve flexibility, and allow universities to fully leverage their research and academic resources for carbon offset projects while also ensuring an immediate climate impact. The overarching goal of college and university climate neutrality agreements is to *reduce global greenhouse gas emissions*, but the desire to innovate and educate at the university level sometimes leads to offset co-benefits receiving higher priority than emissions reductions. The aspiration to build community resilience through innovative, high co-benefit projects is a crucial part of combating climate change, but it should not come at the expense of mitigating emissions today. Bundling takes marketable, low-cost offsets that represent real and permanent reductions, and pairs them with university led, high co-benefit projects. This process allows institutions to reap the co-benefits of offset projects while having an immediate and measurable climate impact.

1: Permanent, Additional, Verifiable, Enforceable, Real

Why Bundle?

3.1 Benefits of Bundling

Bundled products provide a level of insurance for universities that PAVER requirements have been achieved, data was collected appropriately and is stored safely, offset production milestones were met, and co-benefits were measured and verified. By bundling, universities can both mitigate emissions globally through 3rd party verified offsets and mitigate, adapt, and provide co-benefits locally through innovative offset projects. Bundling allows us to leverage both the robustness, scale, and lower costs of 3rd party offsets and the academic, research, and local co-benefits of innovative projects.



3.1.1 Flexibility

While the overall goal of innovative offset projects is to have an emissions reduction and meet PAVER requirements, the timeline associated with these goals is not concrete. Pilot projects often have a lengthy maturation time and require replication, improved data collection, and technological developments before meeting these final goals. Bundling allows for colleges and universities to invest in innovative projects, knowing a minimum amount of real emissions reduction has occurred. In addition, bundling allows universities to take on projects where data collection/management and offset quantification may prove difficult.



3.1.2 Cost

Despite the numerous co-benefits associated with innovative offset projects, the inability to quantify these values in an ecosystem services marketplace keeps the cost per emissions reduction very high. While the climate and local impact of these projects exists in certainty, there is a balance between providing co-benefits and meeting budget demands. Bundling allows the cost per offset to remain within the bounds of a finite budget without sacrificing the co-benefits that do not currently have a set dollar value.

Bundling helps you budget on a cost per offset basis because it builds off the market price for each bundled 3rd party offset. For example, as maturity dates on climate neutrality goals have not yet arrived, most institutions make their offset purchases based on an internal budget. If an institution sets a budget of \$50,000 to spend on offsets, the investment could be approached in a few ways. The institution could, 1. choose to invest only in innovative projects and potentially yield a few offsets at a high cost, but with numerous co-benefits, 2. choose to invest in low-cost 3rd party offsets with a measurable climate impact, but few local co-benefits, or, 3. the institution could choose to bundle and achieve both goals, with a targeted cost per offset in mind. With the goal of keeping the total cost per offset at \$10 and an internal budget of \$50,000, this institution could invest in 5,000 3rd party verified offsets at \$2.00 each and secure \$40,000 for an innovative project with direct co-benefits to the university and community. Bundling meets both climate and academic goals without sacrificing the financial bottom line.

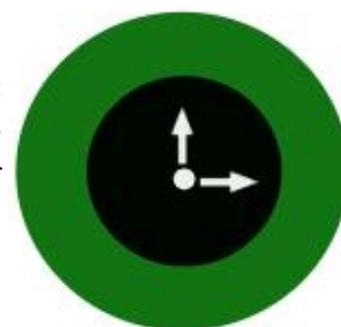
Cost



3.1.3 Timing

Innovative offset projects rarely produce verifiable carbon offsets at the time of project implementation. Often there is considerable time to maturation for a project, leaving institutions with current costs and future benefits. For example, with urban forestry, the time of tree-planting is almost never the time of offset generation. These trees must go through a nursery stage before generating emissions reductions, sometimes taking years, and without any assurance of project success.

Timing



While these future benefits should not be overlooked, they do run counter to the climate goals at the forefront of carbon offset purchases. Future climate benefits do not reduce emissions today, nor do they align with the core of Climate Action Plans. Emissions reductions must happen now, and bundling allows universities to continue leading the fight against climate change without sacrificing innovation.

3.1.4 Risk Mitigation

While high initial investments often hinder the development of innovative offset projects, the risk associated with return on investment and questionable climate impact also limit new projects. Bundling allows for a reduction in risk, by ensuring that measurable climate impacts happen now and spreading individual risk across the whole bundle, through the retirement of 3rd party verified offsets, without sacrificing the co-benefits of innovative projects.

Risk Mitigation



3.1.5 Going Above and Beyond Climate Goals

The primary goal of bundling is to return to the original university goal of having a measurable climate impact, without sacrificing an environment within

which institutions strive to best utilize their research and academic resources. By bundling 3rd party offsets with innovative projects that strive to meet PAVER requirements, a project is created whose goal is to provide more GHG emissions reductions than just those provided by the 3rd party offsets, and additional co-benefits.

For example, if a university bundles by investing in employee energy efficiency projects and purchasing 3rd party verified offsets, this university is not only having a climate impact by retiring verified offsets. In this scenario, the university is also providing co-benefits to employees and reducing energy use, thus providing an even greater benefit than those entailed in internal GHG accounting. By only applying the 3rd party verified offsets to GHG accounting, real climate impact is ensured and institutions remain climate leaders by providing an impact that goes above and beyond the bounds of the 3rd party offset, in terms of both mitigation and adaptation.

Going Above and Beyond Climate Goals



4 How Does it Work?

At its core, bundling is the acquisition and retirement of 3rd party verified offsets that meet PAVER requirements in conjunction with development of a local project. These two parts can be achieved separately, but when combined purposefully allow for flexibility, risk mitigation, and expanded climate impact.

4.1 How Do You Report?

4.1.1 Accounting

As previously mentioned, bundling involves only reporting the retired 3rd party offsets in GHG accounting, but allows using other outlets to show the extended impact of the innovative projects. This purposefully underestimates the climate impact of the bundled innovative offset project and 3rd party offset, to ensure that no emissions reductions are overstated. Only upon following appropriate verification processes that ensure innovative projects meet PAVER requirements can these offsets can be included in GHG accounting. Again, as the original climate action goal involves *reducing greenhouse gas emissions*, this method of accounting reaffirms our focus and retains colleges and universities as climate leaders, ensuring the impact extends past the numbers included in accounting processes.

4.1.2 Language

While bundling allows for budgeting based on cost per offset of both the 3rd party certified offset and the innovative project, the language around bundling should remain transparent. Although the bundle *does* have both an emissions reduction and a wealth of co-benefits, neither half can claim the whole benefit. By bundling, universities cannot claim the 3rd party emissions reduction as associated with the innovative project, nor can they claim the innovative project co-benefits with the 3rd party offset. Bundling allows these two facets to be coupled into one entity from a budgetary sense, but should be communicated with full transparency.

For example, should a university choose to bundle a 3rd party verified landfill gas recapture offset with a local tree-planting project, this university could not claim the retired offset emissions reduction as generated by the tree-planting. While the local project will likely result in an emissions reduction, by bundling, the university is not counting this additional climate impact in their GHG accounting and thus should not market the bundled emissions reduction as part of the tree-planting project.

5 Case Studies

5.1 Urban Forestry

Since signing a Climate Action Plan in 2007 and developing the Duke Carbon Offsets Initiative (DCOI), Duke University has invested in several urban forestry projects. Urban forestry, a project with an established protocol on a offset market level, was difficult to develop at the local level. The DCOI created a new protocol for local tree plantings, however, given the lengthy time to maturation often associated with urban tree plantings and the uncertainty regarding project maintenance and upkeep over that lifespan, urban forestry projects presented some element of risk.

To account for this, Duke has recently transitioned to paying a bundled price of \$15/offset, with part of that price attributed to 3rd party offsets from a regional verified project, and the rest funding local tree plantings and maintenance. This methodology follows the idea of offset bundling: attaining verified emissions reductions and coupling those with local projects that provide tangible, but difficult to quantify, co-benefits for the community, at a cost that meets the university's budgetary constraints. In this way, the 3rd party offsets reduce risk and allow for immediate funding of local projects.



5.2 Energy Efficiency

Energy efficiency projects are often perceived as the “low-hanging fruit” regarding emission reductions, because they represent cost savings and a measurable climate impact. Unfortunately, innovative energy efficiency offset projects also present considerable challenges meeting PAVER requirements in a cost-efficient manner.

Duke University developed a series of pilot programs from 2012-present, to help employees increase the energy efficiency of their homes. To ensure educational and community co-benefits, the pilot projects included student training in energy efficiency and free energy audits for employees. The pilot programs, though successful in providing numerous co-benefits, presented challenges. First, the process of data collection required home energy usage data provided by the Duke employees that participated in the project. Because DCOI was unable to attain this information directly from the utility, data collection hinged on the cooperation of participants to calculate carbon offset estimates.



In addition, energy efficiency is claimed by local utilities, like Duke Energy, towards their own Renewable Portfolio Standards, as set out by each state. In the case of North Carolina, this could pose potential issues of double-counting in areas where the division of claims between energy efficiency and emissions reductions is not clearly articulated by each party involved.

Because of these challenges, as well as the high cost per offset (~\$150), Duke has molded the program into an energy efficiency workshop. The workshop aims to provide Duke employees with the information necessary to implement these changes themselves, or hire a reliable contractor, and then Duke bundles the associated co-benefits with 3rd party offsets to ensure an easily measured emissions reduction at a price that meets the university's budget.



Above: Energy Efficiency Workshop at Duke University

6 Does it Work for Your University?

6.1 Things to Consider

The context of bundling is relatively straightforward. Universities have two goals regarding offsets:

1. to have a *climate impact*, and
2. to provide *learning and research* opportunities for students and faculty, as well as other associated co-benefits.

One should not limit the other, nor should one be sacrificed. Bundling helps achieve these two goals in a cost-effective manner. Despite the relative simplicity around the concept of bundling, every university is presented with its own independent set of challenges and concerns regarding offset purchases that may complicate the concept. The sections below aim to address how each of these challenges may affect an institution's decision-making process and pose important questions to consider.

6.1.1 Budget

Higher education is not without its own budgetary constraints. Innovative projects are costly, present varying levels of financial risk, and often present challenges with ensuring emissions reductions in the long-term. In addition, should innovative projects attain emissions reductions that meet PAVER requirements, the cost per offset is often quite high and scaling the project is limited in the short-term.

Things to consider:

- How much are you willing to spend per offset?
- How does your university value innovation and co-benefits relative to emissions reductions?
- What is your university's comfort level with risk?

6.1.2 Climate Goals

Colleges and universities signed climate action plans because there was a recognition of the need for leadership and action amongst the academic community. This need has not wavered, but rather increased with the continually increasing atmospheric CO₂ levels. Since signing on to climate agreements, there has been some transition of focus from the emissions reduction, which exist but cannot be seen locally, to the very tangible co-benefits.

Things to consider:

- What has been the main motivator in pursuing offset projects to date?
- What will be the main motivators in the future?
- How does your university value additional emissions reductions today, versus just meeting the agreed reductions in the future?

6.1.3 Valuing Research and Education

Colleges and universities are built around principles of education and research. These principles have been a direct benefit and driving factor in the creation of new offset projects. Innovative offset projects are both important and necessary in the fight against climate change, and should not be limited in their capacity.

Things to consider:

- Does your university desire to explore the research side of carbon offsets?
- Is there a group of faculty and students who would benefit from innovative offset project development?
- Is innovative offset research and development an important part of your university's climate action plan?

6.1.4 Valuing Local Impact

Innovative offset projects provide a multitude of local impacts. While many of these co-benefits represent ecosystem services without a marketplace or dollar value, their impact is tangible and real. Colleges and universities often represent the backbone of their local communities, providing leadership in community growth and development.

Things to consider:

- How does having a local impact play into your university's climate goals?
- How does your university value these impacts despite the lack of associated market value?

6.1.5 Appetite for Risk

Every institution approaches risk differently. Innovative projects are much riskier in terms of emissions reductions, as they have no protocol or standard and their success is questionable.

Things to consider:

- How much risk is your university willing to take in innovative project development?
- How much risk can your university handle in offset purchases?



Above: Community Tree Planting Event in NC

7 Bundling Best Practices

7.1 Where Do Your Offsets Come From?

Offsets have a variety of sources, from landfill methane recapture to avoided conversion, and each comes with some level of risk regarding permanence and additionality. Leveraging this risk against the associated cost and co-benefits should be considered when making purchases in the marketplace. While low-cost offsets are 3rd party certified and often very reliable in measurable emissions reductions, it is important that the offset choice still represents the goals of the university.

From the perspective of Duke University, offset costs associated with a bundle should fall between \$10-\$15 per offset, with a minimum standard of \$2 per 3rd party offset purchased. Institutions have the freedom to pay more per bundled offset, or purchase costlier 3rd party offsets with greater co-benefits. This range represents a best practice guide to budgeting bundles, and allows for low-risk, real emissions reductions and the necessary capital to innovate and implement. The total amount of capital available for innovative projects would vary based on the scale of 3rd party purchase, but still provides \$8-\$13 per offset to invest in projects with immense co-benefits and potential future emissions reductions.

7.2 Design of Local Projects

Bundling, while envisioned to reduce the risk associated with innovative project implementation, should not be confused with shortcutting PAVER requirements during design and implementation. The goal of bundling is to allow institutions the flexibility to meet different demands within the scope of finances, research, and co-benefits, without sacrificing the climate impact. Design of local projects should still focus on meeting the standards of peer-review or 3rd party verification. While bundling considers any emissions reduction outside of the retired 3rd party offset a climate “bonus,” it does not mean that climate impact should no longer be the forefront of these innovative projects. Bundles should provide innovative projects with extensive co-benefits that aid in climate adaptation, an immediate emissions mitigation through 3rd party verified offset retirement, and the potential for future emissions reductions and project development.

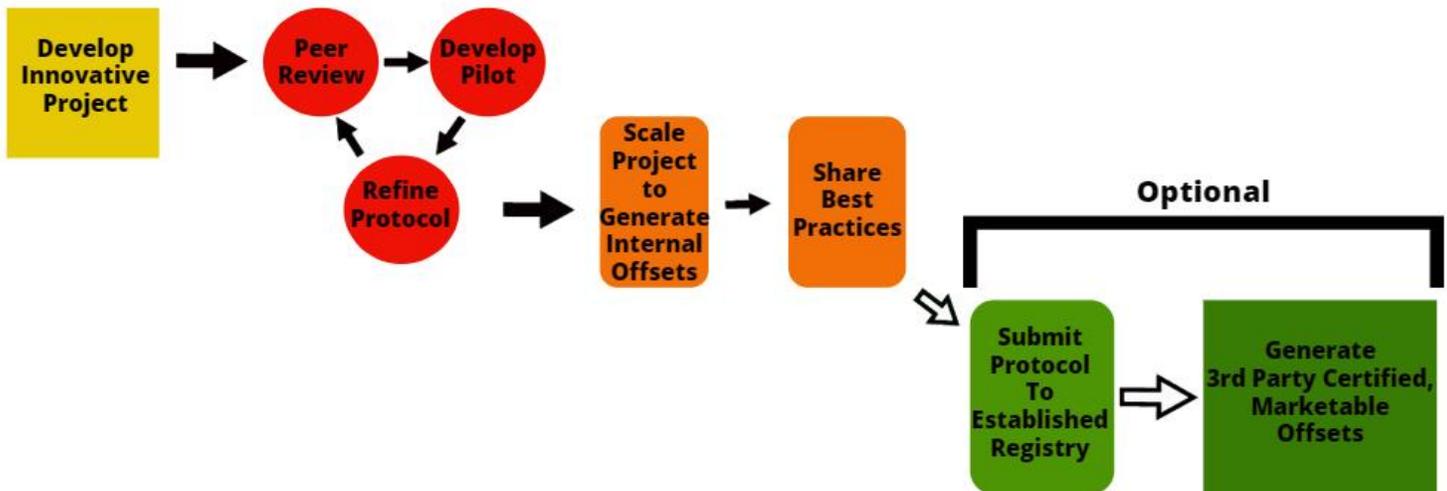


Above: Intern Trip to Loyd Ray Farms, a swine waste-to-energy project, 2015

8 The Path Forward

As research and education grow in importance around carbon offset use at the university level, the need for a system that promotes these co-benefits without forfeiting a climate impact has arisen. Using the resources at the university level, a process of project and protocol development and peer review is the next step, allowing institutions to follow the well-established research journal system within which they already work.

In this new era of offset development, universities fill a new role as incubators for new projects and protocols. Institutions can then submit these projects and protocols to a peer-review system, drawing on fellow academics for critique. Following this peer-review, institutions could choose to submit established innovative protocols to existing registries if they wanted the option to produce marketable 3rd party verified offsets. Using a pre-existing resource, offsetnetwork.org, DCOI aims to establish a central resource for peer-review efforts and sharing best practices to further both the academic and climate goals of institutions across the globe.



9 Conclusion

While the degree of climate damages from greenhouse gas emissions is still uncertain, absent immediate collective action, some level of damage will occur. Institutions with climate goals must not lose sight of this need to mitigate greenhouse gas emissions today. Thus, it is important that colleges and universities implement strategies that ensure mitigation while also meeting other internal goals, such as prioritizing projects with educational, research, and other co-benefits. Developing innovative projects is one of the best ways for institutions to leverage our collective academic resources to create scalable solutions to combat climate change, and the bundle strategy allows institutions to do this in a way that also results in real, immediate reductions in greenhouse gas emissions.

Climate Goals were not built around an all-or-nothing date that the climate hinges on. To return to the original goal, to have a climate impact, institutions must act sooner rather than later. Bundling aims to offer that, without sacrificing the financial, research, and educational bottom line.

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**For more information on the
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