



Duke Carbon Offsets Initiative

Guide to Carbon Offsets and Co-benefits



**Duke Carbon
Offsets Initiative**
DUKE UNIVERSITY

Duke Carbon Offsets Initiative



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. To be climate neutral, 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 DCOP's beginning in 2009, it has developed a number of innovative carbon offset programs in swine waste-to-energy, urban forestry and energy efficiency.

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.

Carbon Offset Basics

What is a Carbon Offset?

According to the American College and University President's Climate Commitment (ACUPCC) a carbon offset is a **reduction or removal of one metric ton of carbon dioxide equivalent (CO₂e)** greenhouse gas (GHG) emissions that is used to counterbalance or compensate for ("offset") emissions from other activities.

Basic Requirements of a Carbon Offset

Permanent—The reduction must last in perpetuity.

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

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

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

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

Co-Benefits

Many carbon offsets projects have benefits beyond the GHG emissions reduction. As colleges and universities work to decide what types of projects to develop or purchase offsets from, co-benefits become one of the main considerations. To-date, Duke University has prioritized developing carbon offsets projects with high co-benefits.

The following list of co-benefit categories serves to distinguish one carbon offset project from another:

- Educational Opportunities
- Social Engagement and Equity
- Environmental Health and Conservation
- Scalability of Project Type
- Partnerships and Public Relations

This document will detail each of these co-benefit categories as well as three example carbon offsets projects that the Duke Carbon Offsets Initiative has developed to date.

Description of Project Co-Benefits



Education

Duke University focuses on how a project will provide students, faculty, and staff with opportunities for:

Research

- Data collection and availability
- Faculty publication opportunities
- Ability to create institutional knowledge on the project subject area

Participation in Designing the Project

- Involving students in creating project-planning materials

Participation in Implementing the Project

- Allowing students to volunteer or collect data from the project

Visiting and Touring the Project

- Location of the project – ensuring proximity to Duke University
- Accessibility – providing students, staff, or faculty with access to the site

Example Project

A local urban forestry project where students are able to help develop program materials, volunteer at tree planting events, collect data on the health and location of trees, and visit anytime.



Social

Duke University prioritizes projects with social co-benefits that assist local and regional communities in the following ways:

Increased Social Equity

The project helps increase the well being of community members with low socio-economic status in order to decrease the inequality gap

The benefits and costs of the project are shared equally by all project participants regardless of age, religion, race, ethnicity, gender, socioeconomic level, and education background.

Community Engagement

The project provides Duke the opportunity to engage the local community at the project location in a way that benefits the community.

Example Project

An energy conservation education program that educates local Durham residents on how to save energy within their homes, regardless of their socioeconomic status.

Description of Project Co-Benefits



Environmental

Duke University emphasizes its commitment to climate neutrality by ensuring offset projects lead to increased environmental quality in the following ways:

Air Quality

Air quality refers to the health of Earth's atmosphere and the cleanliness of ground-level air. A good project reduces the negative impacts of air pollution by decreasing the number of harmful pollutants such as sulfur dioxide and particulate matter from entering the air.



Water Quality

Water quality refers to the health of Earth's streams, rivers, lakes, and oceans. A good project reduces the negative impacts of pollution by decreasing the number of harmful pollutants such as nitrogen and phosphorus from running off into waterways. Projects that reduce storm water runoff will also be considered as they can lead to increases in water quality and a decrease in the amount of infrastructure needed to manage high storm water flows.



Biodiversity

Biodiversity refers to the variety of flora and fauna within an area. A good project maintains or leads to an increase in the variety of native flora and fauna in an area.

Land Use / Soil Quality

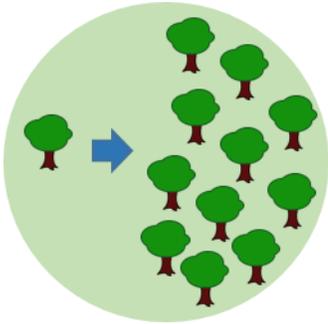
Land use refers to the availability and quality of the land. This includes the project's effects on soil quality, erosion control, land availability, and land use. An ideal project either maintains or increases the quality of the land and the availability of the land for environmentally beneficial uses.



Example Project

The Loyd Ray Farms swine waste-to-energy system generates renewable energy and offsets while simultaneously cleaning up the waste stream. The system improves water quality by reducing the amount of nutrients in the wastewater, decreases odor within and outside of the barns, and increases the health of the hogs. Thus, this project provides positive co-benefits for air quality, water quality, and land use.

Description of Project Co-Benefits



Scalability

Duke University seeks to invest in projects that have the ability to grow and take advantage of economies of scale — as the project grows, efficiencies are gained and fewer resources are needed to produce additional offsets. The ideal scalable offset project has few barriers to expansion and can be easily replicated.

Example Project

Forestry projects in developing countries tend to be highly scalable. These projects benefit from economies of scale as the cost to purchase and manage each acre of a forest decreases significantly as more acreage is added. A 100,000-acre forest can provide offsets at a significantly lower per-offset price than a 1,000-acre forest.



Partnerships and Public Relations

Duke University values its diverse array of governmental, non-profit, and corporate partners. An ideal project fosters good publicity for Duke through print, social media, or televised sources and results in the formation of longstanding and impactful partnerships between Duke and other institutions.

Example Project

The Loyd Ray Farms project has been highlighted in a number of articles in local and national newspapers, as well as videos that discuss the project. DCOI has been asked to consult on similar projects around the U.S.



Additional Requirements

In addition to general project co-benefits, Duke University has minimum standard requirements that must be met by projects before they can be considered. These include:

- Project is verified by at least one third-party agency
- Project has at least one educational component
- Project has at least one other co-benefit as listed above
- Project does not have negative impacts on public relations

Example Carbon Offset Projects



Waste-to-Energy

[Duke University's Loyd Ray Farms project](#) (LRF) anaerobically digests hog waste to produce and capture methane gas that is burned in an on-site microturbine. The renewable energy generated is used to power the waste-to-energy system and provide electricity to the hog barns.

Co-benefits: The project provides site visits for employees and students at Duke University and data analysis opportunities to students and researchers to help inform future waste-to-energy projects. The system also improves water quality by reducing the amount of nutrients in the waste water and increases the health of the hogs by limiting the amount of ammonia in the flush water. Finally, the system decreases odor within and outside of the barns, increasing the standard of living for local community members.



Energy Efficiency

[Duke University's Home Energy Affordability Loan](#) (DCOI-HEAL) pilot program, provided homeowners with access to reliable information, highly skilled contractors, and low-interest loans to help employees increase the energy efficiency in their homes. Participants were encouraged to increase the energy efficiency of their home, which will save them money and increase the comfort of the home for many years to come.

Co-benefits: This project educated homeowners about how they could reduce energy use in their homes. Students helped develop the pilot program and design future energy efficiency programs through data analysis and research of best practices. Participants continue to save money on their energy bills and have higher indoor air quality since completing their home energy improvements.



Urban Forestry

Duke University's Urban Tree Planting Pilot Project planted 40 trees in Wilson, NC. The project was developed through a partnership between Duke University, Urban Offsets, and the city of Wilson, North Carolina. These trees will continue to grow and sequester carbon over the next 50-100 years and will be tracked via a carbon offsets tree planting protocol designed by the DCOI.

Co-benefits: Tree planting projects provide opportunities for community engagement through local governments and neighborhood associations. Trees within the city provide a multitude of environmental benefits including stormwater and air pollution absorption, habitats for animals and pollinators, and reduction in energy use from nearby homes by providing shade on sunny days. Well maintained trees have also been shown to increase property values, reduce noise from nearby traffic, and reduce instances of crime.

For more information on the
Duke Carbon Offsets Initiative, please visit
http://sustainability.duke.edu/carbon_offsets/