Lowering the climate impact of higher education

Universities and carbon credits:

Q1 2019

CO2OL EFFECT

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Contents

Cool Effect is a non-profit whose mission is to enable individuals and organizations to fund the highest quality carbon reducing projects in the world. We believe in exceptional due diligence, detailed information on projects, absolute additionality and transparency of project pricing and fees. We fund only the best projects that verifiably reduce carbon.

About The Carbon Institute Carbon is Earth’s most vital element. The Carbon Institute’s mission is to train a new workforce to rapidly improve management of terrestrial and marine carbon. We use science, education, and cooperation to rapidly scale natural climate change solutions. Our partnerships build platforms that reduce carbon emissions, increase carbon sequestration, and enhance resilience to climate change. Partnerships of equals are the best way to build a global workforce that meets the Paris Agreement’s objective and achieves the United Nations 2030 Sustainable Development Goals.

Higher education is leading in the race against climate change. Game-changing research is creating cleaner technologies. New courses and degrees in climate science and policy prepare the next generation for leadership.

Carbon credits can be a fast, effective means to lower your campus climate impact. Finding quality credits is complicated. This guide helps you make good choices and avoid the pitfalls.

Many colleges and universities are also directly intervening to limit climate change by taking responsibility for their own carbon footprints.

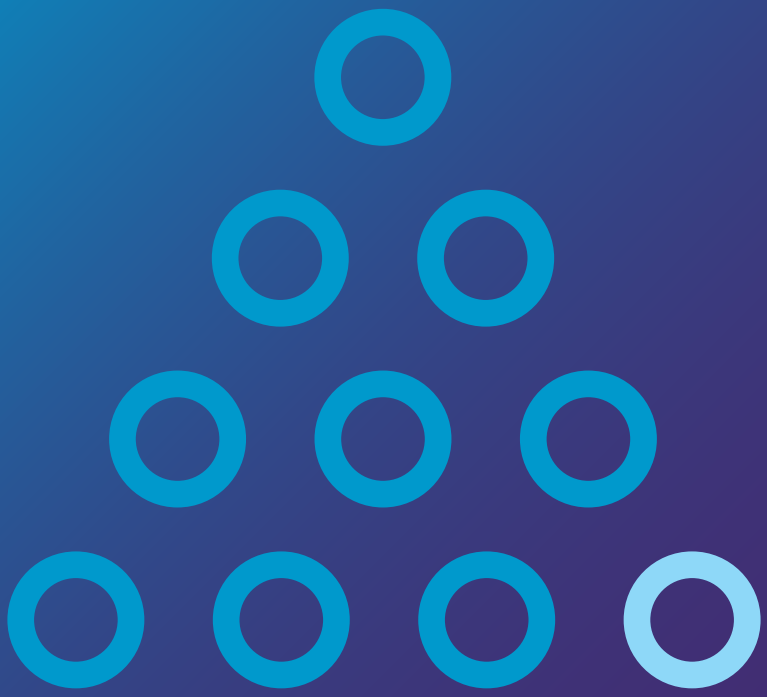
Carbon offsets, also known as carbon credits, are a common, credible, and cost-effective tool for rapidly reducing climate impact that fits well within a portfolio of other emission-reducing programs. This introductory guide will provide tips for identifying high-quality credits and avoiding low-quality credits that do not reduce carbon emissions.

Sorting out the measurement term for carbon credits.

Metric Tons are often referred to simply as

tonnes

A **U.S. Ton** is different from a **Metric Ton**



$mtCO_2e$

CO_2e

The unit of measurement for carbon credits is Metric Tons, **Tonnes** of carbon dioxide equivalents **CO_2e** or simply **$mtCO_2e$**

10 / 9

1.0 **U.S. Ton** = 0.9 **Metric Ton**

What are carbon credits?

Carbon credits counter/compensate/offset the impacts of greenhouse gas emissions caused by university activities.

They are measured in Metric Tons **(tonnes)** of Carbon Dioxide Equivalents **mtCO_2e**. For each tonne emitted, carbon credits are used to fund activities to prevent a tonne or reduce a tonne from being emitted somewhere else. Credits can be purchased and retired to formally compensate for emissions and contribute to achieving emission reduction goals.[1]

These credits are generated by carbon projects that are likely to be familiar to you as they employ well-recognized mechanisms for reducing emissions. The projects often provide other local social benefits as well. Laboratory and field testing with third party verification ensure successful calculation of greenhouse gas reductions in tonnes of carbon dioxide equivalents and enable a project to periodically issue credits. Individuals and organizations purchase these credits to cancel out the portion of their climate impact that either cannot be reduced or is too difficult or costly to reduce in another way. An individual, for example, can offset a coast-to-coast roundtrip flight for about the price of two lattes.

credit

In most sources, the terms **"carbon offset"** and **"carbon credit"** are synonymous and these terms are used interchangeably in this report.

[1] Stockholm Environmental Institute. Bailis, R., Broekhoff D., Lee, C.M., *Supply and sustainability of carbon offsets and alternative fuels for international aviation.* http://assets.wwf.org.uk/downloads/sei_wp_2016_03_icao_aviation_offsets_biofuels.pdf

When and why would I want to obtain carbon credits for my university?

The general rule of thumb for use of carbon offsets as part of a corporate or university sustainability strategy is that they should come after all other actions are reasonably taken to reduce the carbon footprint of the company or institution.

These actions usually result from campus-wide climate change plans and may include adopting energy efficiency measures, encouraging conservation, switching to renewable energy, reducing food waste, promoting low-carbon transportation and other cost-effective policies that prevent emissions in the first place. An excellent review of opportunities for mitigation/reducing emissions as created by Second Nature[2] can be found here.

University of California Through the Carbon Neutrality Initiative, the UC system has pledged to become carbon neutral by 2025, counting emissions from buildings and vehicle emissions. Emissions reductions will be achieved through selective electricity procurement, energy efficiency, onsite renewable energy projects, and biogas, using offsets to close the gap to net zero.

[2] Second Nature, *Carbon Management and Greenhouse Gas Mitigation,* https://secondnature.org/climate-guidance/sustainability-planning-and-climate-action-guide/building-blocks-for-sustainability-planning-and-climate-action/carbon-management-greenhouse-gas-mitigation/

After making their own reductions, there are many reasons campuses start thinking about purchasing carbon credits. These include:

- To take immediate, measurable action and show leadership in the reduction of global greenhouse gas emissions.
- To become carbon neutral (see box on next page).
- To meet greenhouse gas (GHG) emission targets while longer-term solutions are put in place.
- To gain access to an inexpensive, long-term intervention to reduce carbon emissions if other alternatives such as power purchase agreements, creation of solar or wind farms, forest land purchase and management are not economically feasible or appropriate. Carbon credits often result from efforts like these and thus provide an opportunity to participate in these kinds of programs without owning them.
- To promote access to clean technologies in developing countries such as solar lanterns to replace inefficient kerosene lanterns and improved cooking devices to replace inefficient open fires.
- To provide valuable social benefits such as improved health, reduced drudgery or fuel costs.
- To provide an example and encourage broad participation in other carbon reducing activities by stakeholders.
- To attract students and families that view environmental and social responsibility as a high priority in their selection process.

Carbon neutral defined. For purposes of the Carbon and Climate Commitments, carbon neutrality is defined as having no net greenhouse gas (GHG) emissions, to be achieved by minimizing GHG emissions as much as possible and using carbon offsets or other measures to mitigate the remaining emissions. To achieve carbon neutrality under the terms of the Carbon and Climate Commitments, all Scope 1 and 2 emissions, as well as Scope 3 emissions (see Box below for definitions) from air travel paid for by or through the institution and regular commuting to and from campus, must be neutralized.[3]

The terms *carbon neutral, climate neutral* and *net zero* are typically used interchangeably and refer to using carbon credits to cancel out any emissions that are not able to be reduced or have not yet been reduced through other actions.

[3] ibid.

What is the process? How do we know how many credits to buy?

First, determine how many credits you'll need to reduce your university's total carbon footprint and meet your sustainability goals. A university carbon footprint will come from **Scope 1, 2, and 3** emissions which include: electricity and natural gas usage in university buildings, university vehicles, business travel by researchers and university personnel, meals served in dining halls, and waste, among other areas. This is an involved process of data collection and analysis.

As noted previously, the use of offsets should come after all other reasonable efforts to reduce carbon use have been carried out. The net remaining amount of carbon use, measured in tonnes of CO_2 equivalent, represents the target for use of carbon offsets.

Scope 1 These are emissions that arise directly from sources that are owned or controlled by the university: for example, from fuels used in boilers or the vehicles that departments and facilities management own. These emissions can be avoided or reduced through improvements in efficiency and conservation.

Scope 2 These are the emissions generated by purchased electricity consumed by the university. These emissions can be eliminated by switching to renewable (zero carbon) sources of energy.

Scope 3 These emissions are a consequence of the activities of an organization but occur from sources not owned or controlled by the organization. They include emissions associated with waste, water, business travel (including air travel, commuting, purchased goods and services, and fuel) and energy-related activities not included in Scope 1 or 2. These emissions can be eliminated by sequestering or offsetting.[4] (Note sequestration refers to the process of capturing and storing atmospheric carbon dioxide in plants, soils, geological formations and the oceans.)

[4]University of Cambridge, *The University's Carbon Footprint,* https://www.environment.admin.cam.ac.uk/what-are-we-doing/carbon/scope-1-2-and-3-emissions

The process of acquiring carbon credits should come after actions to reduce your own emissions, increase stakeholder engagement, and communicate your successes:

01 Engage your university community

02 Measure university carbon footprint

03 Find opportunities to reduce your own emissions

04 Take action and reduce emissions

05 Determine remaining emissions

06 Find reputable carbon offset suppliers

07 Buy offsets that match your mission and preferences

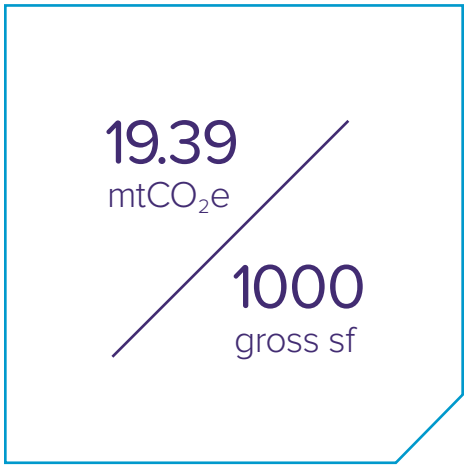
08 Go carbon neutral

09 Communicate your choices and results

It should be possible to access assistance within the University in addition to a large community of technical greenhouse gas measurement professionals that can help you with the process of assessing your carbon footprint and setting goals for neutrality. This process could also be a excellent learning opportunity for students.

Impact of university emissions In 2010, greenhouse gas (GHG) emission estimates from signatories of the American College and University Presidents' Climate Commitment (ACUPCC) were compared across Carnegie institutional classifications. Average annual emissions from all institutional classifications are 52,434 tonnes of carbon dioxide equivalent (mtCO2e), with emissions from purchased electricity, stationary combustion, and commuting accounting for approximately 88% of total emissions.

Average annual emission intensity from all institutional classifications is 19.39 $mtCO_2e$ per 1000 gross square feet (GSF) and 7.67 $mtCO_2e$ per full-time equivalent (FTE) student. In 2005, U.S. institutions of higher education accounted for approximately 121 million $mtCO_2e$, or nearly 2% of total annual U.S. GHG emissions.



For reference, these emissions are comparable to approximately one-quarter of those from the state of California. Because ACUPCC signatories represent over 30% of U.S. higher education enrollment, their long-term commitments to carbon neutrality can result in a measurable reduction (0.6%) of total annual U.S. GHG emissions.

Note: The Carnegie Classification of Institutions of Higher Education is a framework for classifying colleges and universities in the United States. The framework primarily serves educational and research purposes, where it is often important to identify groups of roughly comparable institutions.

Parikhit Sinha , William A. Schew , Aniket Sawant , Kyle J. Kolwaite & Sarah A. Strode (2010), *Greenhouse Gas Emissions from U.S. Institutions of Higher Education, Journal of the Air & Waste Management Association*, 60:5, 568-573, DOI: 10.3155/1047-3289.60.5.568, https://doi.org/10.3155/1047-3289.60.5.568

Of the two types of credits—voluntary and compliance—universities would largely purchase voluntary credits

Voluntary credits are the main type of credit discussed in this document. Credits in the voluntary markets are purchased by individuals, corporations, organizations and institutions. Credits of interest to universities are voluntary; in other words, buyers purchase credits by choice rather than under a legal requirement to do so. Voluntary buyers can purchase credits issued under both compliance and voluntary programs.

On the next page is a list of international offset standards, all of which operate secure registries that issue credits and track documentation and transactions to prevent double selling. The standards issue credits with different names under valid scientific methodologies. However, there is no global system to evaluate the integrity of offsets, nor are there universal standards to do so. Different standards establish their own criteria and then validate and certify different project types and use different processes for achieving offset issuance.

Common criteria discussed further in this document, involve standards for quantification, verification and eligibility.[5] Some standards also include requirements that the project not only reduce emissions, but also include additional benefits (called co-benefits), such as employment or training for local populations, the preservation of biodiversity, or other non-carbon impacts.[6]

For a more robust review of Voluntary Carbon Standards and their methodologies consult **Forest Trends,** *State of the Voluntary Carbon Market, 2017* which can be found here.

[5] Stockholm Environmental Institute. Bailis, R., Broekhoff D., Lee, C.M., Supply and sustainability of carbon offsets and alternative fuels for international aviation. http://assets.wwf.org.uk/downloads/sei_wp_2016_03_icao_aviation_offsets_biofuels.pdf

[6] https://ucop.edu/sustainability/_files/carbon-neutrality2025.pdf

Table 1 — **Offset standards**

Standard	**Type of credit issued equivalent to 1 Metric Tonne of greenhouse gas reduced**	**Abbreviation**	**Can be purchased by Voluntary buyers?**
Gold Standard	Gold Standard Verified Emission Reduction or Voluntary Emission Reduction	GS VERs	Yes
Gold Standard	Gold Standard Ceritified Emission Reduction	GS CERs	Yes
Verra-formerly Verified Carbon Standard	Verified Carbon Unit	VCUs	Yes
Climate Action Reserve (CAR), California	Climate Reserve Tonne (U.S. and Mexico projects only)	CRTs	Yes
American Carbon Registry (ACR), California	Climate Reserve Tonne (U.S. and Mexico projects only)	CRTs	Yes
Plan Vivo	Plan Vivo Certificate	OVCs	Yes
Clean Development Mechanism (CDM)	Certified Emission Reduction	CERs	Yes

How expensive are carbon credits? Why do credits vary in price?

In purely technical terms, a credit is expected to reflect real, additional reductions of GHG emissions, and only that. The price can sometimes reflect whether or not other benefits are included in your purchase.

Carbon credits range from less than $1 to $45 per tonne of carbon dioxide equivalent (CO_2e). Most prices for well managed and regularly verified projects tend to be between $4 and $10 per tonne. Prices will vary based on additional benefits that are included, such as social and environmental benefits, as well as project location, age of credits and project type.

Projects of consistent quality often command higher prices. If a project sells for less than $1 per tonne, it is hard to see how the sale of carbon credits can have a real impact on the project operations. For this reason, unless the reason for the low price is explicitly stated, we recommend skepticism for credits costing less than $1 per tonne.[7]

Duke University Duke set a target to reach carbon neutrality by 2024 through internal reductions and offsets. The Duke Carbon Offsets Initiative develops new carbon offset projects, in addition to obtaining offsets from existing projects. Projects managed by the initiative include hog farm waste-to-energy, urban forestry, and energy efficiency education projects.

[7] Compare the price of these offsets against the cost of the damages caused by climate change, about $40 per ton (the "Social Cost of Carbon").

How are credits generated and approved for sale?

Moving a project from conception to final issuance of offsets takes two and a half years on average. Common steps required by some—though not all—standard bodies include a Project Idea Note that assesses the feasibility and risks of a project and a Project Design Document that lays out how the project will calculate and reduce or avoid emissions. A third-party auditor then "validates" these assumptions, and, after project implementation and monitoring, another audit process called "verification" assesses the delivery of greenhouse gas mitigation.[8]

Offset project registries then issue each tonne of emission reduction (now an eligible offset) with a unique serial number that can be transacted multiple times before an owner can choose to "retire" it. A retired offset is tagged as unsellable on the registry so that the end buyer can claim the impact of the offset.[9]

[8] Forest Trends, *State of the Voluntary Market, Unlocking Potential,* Page 2 https://www.cbd.int/financial/2017docs/carbonmarket2017.pdf

[9] Ibid.

What makes a carbon credit "high quality"?

The term **Environmental Integrity** is used when speaking about carbon offsets and refers to how well a carbon credit takes the place of the high quality GHG reduction that would otherwise be made by you, the buyer. If buying credits, you must ensure you are buying a real climate benefit because, despite having issued credits for sale, not all projects achieve their claims. Quality credits (credits with environmental integrity) are:

Beyond business-as-usual scenario or are additional (see below).

Correctly calculated and quantified.

Have an exclusive claim to the emission reductions (real).

Include an analysis of leakage.[10]

Issued by an international standard with independent monitoring and verification by an accredited organization.

Permanent. This is a challenge for forestry projects where reduction of emissions can be reversed if trees burn or are cut, but is largely addressed by rules and safeguards of carbon offset programs.

Often beneficial in other ways, the application of social and environmental benefits can be an important addition that is included in the cost of the emission reduction but is not a requirement for designation as high-quality.

Somewhat recent issuance can be important if the project has ceased issuing credits. It might imply a change in regulation implying the project is no longer additional.

[10] In carbon projects, leakage is the unanticipated displacement of an increase in greenhouse gas emissions outside of the project boundary as a result of project activities. For example conserving forests may cause an increase in agricultural activity outside the project boundary.

Additionality A project can only be considered to be additional if:

It is not legally required to do what it is doing though official policies, regulations or industry standards.

It is not profitable without revenue from carbon offsets.

There are other barriers that might otherwise prevent its implementation.

It does not employ technologies or practices that are already in common use.

The "additionality" question The project needs to be additional to what would have happened if the project had not been carried out, i.e., if the activity were not implemented as an offset project, would the emissions reductions have occurred anyway, holding all else constant (e.g., investment conditions)?

Or more simply: Would the emission reductions have happened anyway? If the answer to that is yes, the project is not additional.

Obtaining credits verified by a well-known standard (see Table 1, page 12) goes a long way to prove credits are reputable. Most offset standards require thorough documentation, including independent verification and auditing as daunting and complex as any financial audit.

Though in principle additionality is a simple concept, in practice it can sometimes be difficult to apply. All carbon offset programs have rules and methodological procedures for making such determinations. However, none of these procedures is flawless, and a great concern is that programs certify too many GHG reductions as additional when they are really not.[11] Further screening is often needed and important to ensure credits actually have a climate impact.

[11] Stockholm Environmental Institute. Bailis, R., Broekhoff D., Lee, C.M., Supply and sustainability of carbon offsets and alternative fuels for international aviation. http://assets.wwf.org.uk/downloads/sei_wp_2016_03_icao_aviation_offsets_biofuels.pdf

Why is “additionality” the key issue for finding quality credits?

Despite the efforts of standards, credits with weak additionality often enter the carbon credit markets. Research into the compliance market’s Clean Development Mechanism (CDM) suggests that fewer than 40% of tonnes issued are additional.[12] Voluntary credits can also be issued under methodologies that can vary their long-term treatment of additionality, re-crediting, monitoring or verification requirements or have this terminology be applied inconsistently.

One issue: standards screen for additionality on a pass/fail basis. In reality, the evidence often places projects on a spectrum of additionality. Although standards task independent verifiers with determining project additionality, there are many documented instances where verifiers avoid substantive engagement with regard to the concept of additionality. The pass/fail simplification and perverse market incentives result in the issuance of credits with questionable additionality.

Therefore, a rigorous screening of offset credits should involve technical expertise providing transparent, solid arguments about project additionality.

[12] Alexeew, Johannes, Linda Bergset, Kristin Meyer, Juliane Petersen, Lambert Schneider, and Charlotte Unger. 2010. *An Analysis of the Relationship between the Additionality of CDM Projects and Their Contribution to Sustainable Development.* International Environmental Agreements: Politics, Law and Economics 10 (3): 233–48. doi:10.1007/s10784-010-9121-y.

How can I make sure we buy high-quality credits?

The checklist below is an easy reference to make sure you are buying real credits that reduce carbon emissions and bring environmental or other benefits (and not just "hot air").

Question	Why this is important
1. Are you buying credits from a specific project or projects, rather than a pool of offsets?	Assessing credit quality requires evaluating each project that generated the credits. "Bundled" credits of unknown origin should be approached with caution.
2. Is the project verified independently using an international standard and tracked on a registry?	Standards require project tests and use approved methodologies that are designed to emphasize quality. Standards also require independent, third-party verification. Because a change in one small parameter can have an outsize effect on the quantity of credits issued, careful independent verification is crucial.
3. Are the credits recent? We usually recommend buying credits that are not from "vintages" more than 4 years old but this may not always be the case.	If the project is ongoing, sometimes past vintages may remain unsold due to past market conditions. In order to generate cash flow for the project, they may be available at substantially reduced prices that benefit the buyer. If the project is no longer in operation, unsold older vintage credits may be leftovers for a reason. It will be important to speak with the aggregator or the project directly to understand the reasons for a sale of older vintage credits.
4. Is the project really additional to business as usual?	
a. Common practice check: Is this project different from, or is it only in addition to, existing projects in operation that do not need the sale of credits to be profitable?	High-quality projects are in addition to business-as-usual activities.
b. Legal requirement check: Is this project above and beyond what is already required or s oon-to-be required by law?	High-quality projects are in addition to what is required by law.

Question	Why this is important
4. Is the project really additional to business as usual? (continued)	
c. Investment check: Are credits the only, or an important, source of revenue for the project? If not, does the carbon credit revenue make the project more profitable than other investment opportunities (shown through investment analysis using financial benchmarks)?	High-quality projects need the revenue from credit sales to be profitable or to be competitive against other investment opportunities.
d. Barriers check: Are there other barriers that would make the project challenging (primarily for developing country projects)? For example, does the project employ technologies that are rare in this area?	Projects that overcome major and specific impediments in developing countries are understood to be additional.
5. Does the project offer social benefits in line with the university's mission? Does it prove that it does no harm?	Carbon credits can be an opportunity to further the university's social goals. However, certain projects (especially in the developing world) can also have negative impacts on local people.
6. If it is a forestry project, are you buying credits that include a buffer pool and 100-year contracts?	Because trees are physically vulnerable, forestry projects have a risk of Carbon reversal. If trees are cut down, or as the forest burns, all the sequestered carbon is returned to the atmosphere.

Question	Why this is important
7. Is the project ongoing? i.e., is it visited and reviewed on an annual or other frequency basis by an independent auditor? Can you visit the project or speak with implementors?	Meeting project developers will allow you to build a trusting relationship. Continuous monitoring is important for continuing project functionality and offset quality.
8. Is the project counted only once in the service of an emission claim?	Credits that you purchase should be retired upon purchase. These transactions are tracked on a secure registry.
9. Are the project developers and aggregators transparent and well-respected within the offset community? Has an independent technical professional reviewed the projects under consideration beyond the requirements of the standard?	Dealing with trusted entities and receiving assistance from independent experts helps ensure that your offsets are truly helping the planet.
10. Where does the money go?	Are most of the funds from your purchase of credits reinvested in the project or go to support furthering of the project mission?

What are the different types of carbon projects?

There are many types of carbon credit projects, with more created every year. Theoretically, any project type can be high quality or low quality. Different projects types have distinct benefits and challenges. Here is a small sample of project types with their challenges and risks:

Table 2 — **Project type benefits, and challenges**

Project Type	Non-climate benefits	Challenges and risks to buyers
Renewable energy Projects that install new wind, solar, hydro and other renewable energy sources to avoid fossil fuel emissions.	These projects should be carefully scrutinized (see right). However, some projects can be structured for local employment or to provide low-cost electrification and other community benefits in poor, rural areas. In instances like these, the project can often be considered additional.	1. Due to the growing popularity of renewables, most large-scale renewable energy projects are sufficiently profitable and common that related offsets are not additional. 2. Grid-connected projects no longer tend to be high-quality. 3. Large hydro projects can have major negative social and environmental consequences. 4. There are issues with double counting and additionality as many of these projects also generate renewable energy certificates that would not have been considered in investment analysis.
Industrial N_2O Abatement Projects that capture the potent greenhouse gas nitrous oxide released by fertilizer production and other industrial processes. N_2O is considered the third most important greenhouse gas, a super pollutant, 310 times more effective in trapping heat than Carbon Dioxide (Scottish EPA).	Profitable introduction of nitrous oxide abatement technology builds support for climate-friendly agriculture among the farming community.	1. Must ensure that projects are truly in addition to current and upcoming regulations and common practice. 2. Since projects use complex methodologies, they require stringent review and verification.

Table 2 — **Project type benefits, and challenges continued**

Project Type	Non-climate benefits	Challenges and risks to buyers
Methane capture and avoidance A category of projects that convert waste gas into energy or dispose of gas safely, including gas: from landfills, livestock (biogas), abandoned coal mines (fugitive methane), and rural village waste (biodigesters). These are not related to fossil fuel extraction or "fracking." Organic composting projects also create methane from landfills. Methane is a short-lived super pollutant, considered 84X more potent than carbon dioxide in the short term (Environmental Defense Fund).	Varies by project type. Biodigesters provide energy families can use for cooking, saving money on fuel and reducing animal and human waste. A lower dependence on firewood captures the benefits of the clean cookstoves projects described below. Biodigesters also create compost that can be used for farming. Organic composting projects help reduce food waste, promote the environmental and health benefits of organic farming and reduce fossil-based fertilizer demand.	1. It is important to ensure that projects (especially landfill gas) are truly in addition to current and upcoming regulations. 2. Financial reviews should assess the potential value of the sale of these emissions. Revenue from the sale of the resulting natural gas should cover only part of the income required so the project is truly additional. 3. Recent site visits are important to ensure continued function of methane capture and destruction technologies.
Wind	Projects that provide clean renewable electricity in inaccessible areas are important.	In developed countries and in large developing countries, carbon revenues have a limited impact on profitability and declining investment costs have made wind projects more competitive and common practice.

Table 2 — **Project type benefits, and challenges continued**

Project Type	Non-climate benefits	Challenges and risks to buyers
Clean cookstoves Also known as energy efficiency – households. Projects provide fuel-efficient cookstove technology in poor rural areas to reduce emissions from burning wood for cooking and forest degradation caused by unsustainable fuelwood harvesting or charcoal manufacture.	Clean cookstoves are associated with many potential co-benefits. These projects can deliver major health benefits for women and children due to lower smoke exposure. Less time spent on wood gathering can also provide more time for career and educational opportunities for women and girls. By preserving forests or woodlands, these projects also capture the non-climate benefits of forestry projects above.	1. Reduced wood use results in the reduction of greenhouse gas emissions. However, there is a risk that certain assumptions in methodologies and project design overestimate climate benefits of cookstoves substantially. 2. Some cookstove projects offer stoves that local people don't wind up using, otherwise known as "abandonment". 3. Other projects may use several stoves for cooking or "stove stacking," which impacts the climate benefit. Alternative stove use should be well-monitored, and assumptions of use should be conservative. 4. Use caution where "Suppressed Demand" metholodogy is used to estimate rather than prove reductions in fuel use. This methodology was created for use in the poorest countries in the world; projects of this nature should only be serving those populations. These issues can be ignored by verifiers due to insufficient/non-representative sampling, cost and time limitation during on-site verifications.

Table 2 — **Project type benefits, and challenges continued**

Project Type	Non-climate benefits	Challenges and risks to buyers
Water sanitation projects Projects that replace water boiling with water filtration in poor rural areas.	Projects that provide clean water are also highly charismatic as plentiful clean water is absolutely essential to good health for the world's poorest families and their children.	The very poor have such small carbon footprints that it is difficult to implement projects that target them, since there are practically no emissions to reduce. The concept of Suppressed Demand tries to account for the fact that per-capita emissions would be much higher if the poor had better access to energy and goods. Suppressed Demand is often used as a technique for assessing water projects. The assumptions made under this methodology are theoretical, and often based on default or standardized quantities of water consumption and wood use for water boiling rather than measured values. The figures used in calculations are not 'real' and 'verifiable' and hence can result in overstatement of the climate benefits. It is important that the project serves the extreme poor and if not, that real measurements are taken in the field of the use of wood for water boiling in order to determine the climate impact.

Table 3 — **Forestry projects types**

Project Type	Non-climate benefits	Challenges and risks to buyers
Forestry: avoided deforestation Projects that plant trees, prevent deforestation, or implement sustainable timber practices to sequester carbon or avoid biological carbon emissions.	Many environmental benefits (clean air, clean water, combats erosion, cooling effect). Supports biodiversity habitat. Well-structured projects can create local economic opportunities.	**Social risks** Forest-based offset projects carry some risk of negative social impacts like loss of income or reduced access to forest lands. Projects can be designed to reduce these risks.
Carbon Risks[13]		
Permanence If trees used for offsets are later harvested or affected by fire or disease, the carbon stored will be emitted to the atmosphere, reversing the benefit of any offsets. Although there is no way to guarantee with 100% certainty that trees will remain forever, offset programs have developed measures to reduce the risks of "reversal." **Temporary crediting** The compliance market introduced temporary crediting for afforestation and reforestation projects. Offsets expired after a fixed period and have to be replaced in order for the buyer to meet their obligations. **Insurance buffers** Voluntary offset schemes can insure against the risk of reversals by establishing a buffer reserve. For this to work, a percentage of credits issued to each forest project is set aside in a buffer area managed by the program. If a reversal occurs, it is compensated by retiring credits from the buffer.	**Leakage** Forest-based offsets are also subject to risk of leakage, which can occur: 1. If demand for trees protected by the project is simply shifted to another location so that trees outside the project boundary are cleared. 2. If the land occupied by trees shifts demand for new cropland to other places and leads to tree clearing there. 3. If policies are in place to ensure that more trees are not harvested than those grown during a specific time period. Leakage risk can be minimized by expanding project boundaries. For example, the UN's REDD+ program is implemented and monitored at a national scale.	**Additionality** Forest projects are not additional if the activity would have occurred in the absence of carbon credits. Additionality can be difficult to show in forest projects because baseline trajectories can be highly variable and uncertain. In addition, projects in developed countries are often profitable without the revenue from carbon and hence these projects fail to be additional if assessed for investment analysis/ financial additionality.

[13] Stockholm Environmental Institute. Bailis, R., Broekhoff D., Lee, C.M., *Supply and sustainability of carbon offsets and alternative fuels for international aviation.* http://assets.wwf.org.uk/downloads/sei_wp_2016_03_icao_aviation_offsets_biofuels.pdf

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A note about REDD+ projects

REDD stands for Reducing Emissions from Deforestation and Forest Degradation. The + sign can refer to either (1) the inclusion of forest carbon enhancement activities such as reforestation and improved forest management that remove carbon from the air rather than simply avoid emissions and (2) the inclusion of environmental and social safeguards along with measurements to improve the livelihoods of people in forested areas. REDD+ mechanisms are designed to credit GHG reductions that result from slowing and stopping deforestation and forest degradation across an entire jurisdiction, often involving millions of hectares. However, REDD+ is also used to designate project level activities.[14]

[14] Ibid.

Carbon credits provide true benefits when done properly.

Carbon Credits, when used along with renewable energy and other mitigation and conservation activities, are additive to reduction of GHG emissions and contribute to global decarbonization. They are the only way to account for many Scope 3 emissions and are essential to achieving carbon neutrality. They can provide a temporary means to meet emission targets while other long-term changes to operations can be made.

Credits can also stimulate new low-carbon technologies and dispersal technology to marginalized populations that deliver social benefits. The ultimate goal of carbon credits is to reduce worldwide emissions to the point where they are no longer needed.

Do what you can and more. Remember it's for our planet! Everyone must do what they can to reduce carbon pollution, But, to reach net zero emissions, carbon credits are a solution.

What is Green-e? Green e© offers certification and verification of renewable energy and greenhouse gas mitigation products, a renewable energy certification program and a greenhouse gas emission reduction certification program.

Is it necessary to demand that projects have or pay extra for Green-e, to make sure the offsets are high quality? No. Projects meeting international standards and hosted by credible registries must invest in and pay for a rigorous process of independent validation, verification, and technical review. Offsets are traded on secure registries. If additionality is clear, the project documentation is more than sufficient without the added requirement for a project or buyer to pay for additional certification such as Green-e. The best way to make sure your university purchases a high quality offset is to do the in-depth research necessary to know an offset meets the criteria above.

In addition, since some Green-e projects merely duplicate what has already been approved by a standard, some types of projects should be re-checked to ensure that projects meet current standards for additionality (new governmental regulations, removal of certain financial barriers, etc.).

Green-e certification may be required if offsets are related to LEED certified buildings.

Does it matter where my carbon credit comes from?

From an environmental perspective, a tonne of carbon emitted can be reduced by a tonne of carbon prevented, reduced or sequestered anywhere in the world. You may wish to support projects in areas where climate change is hitting hardest and where people are already experiencing loss, but this has no extra impact on the climate.

Many buyers prefer to "buy local" in order to support local efforts. This is fine, but only as long as there are projects that are truly additional available in your particular area. Additionality should be your first priority in acquiring offsets. Note that projects in developed countries tend to be much more expensive for the same environmental benefit as projects in developing countries.

Second, if the project is additional, try to visit the site! Or, if a site visit is not possible, determine what might be the true economic impact on the local area. Are new jobs created, are there energy savings to a segment of the local population, have you helped the local environment as a result of your purchase, or is it simply a business-as-usual scenario?

Bowdoin College committed to carbon neutrality by 2020 and met this goal two years early. Bowdoin reduced its emissions by installing a combined heat and power plant, through solar hot water heating panels and through weatherization, insulation, waste diversion and other measures. Bowdoin purchased carbon credits and other environmental certificates to "bridge" to net zero, as it continues to reduce emissions.

Where do I buy carbon credits?

Credits can be sold through: brokers, project developers, resellers, aggregators and registries. Who you purchase from may be dependent on how many tonnes you will buy; there may be minimum purchase requirements from some suppliers. Generally, there are price breaks dependent on quantity or year of issuance of the credits.

Projects may often directly sell large volumes of credits; for smaller volumes it may be necessary to purchase from an aggregator or broker. If you obtain credits through these entities, the price per tonne that you pay, and the price paid to the project should be transparent to both the project and you, the buyer. The difference between the two prices and/or the aggregator/broker fee should be clearly disclosed to you.

Be aware that it is often hard to get aggregators to provide this information and beware of any aggregator/broker who hesitates or refuses. Credits can also be obtained on exchanges, although information about the credits you purchase will be even harder to obtain.

It's best to contact at least two providers to understand pricing, commissions, fees and, if possible, how much of your purchase will go to the project.

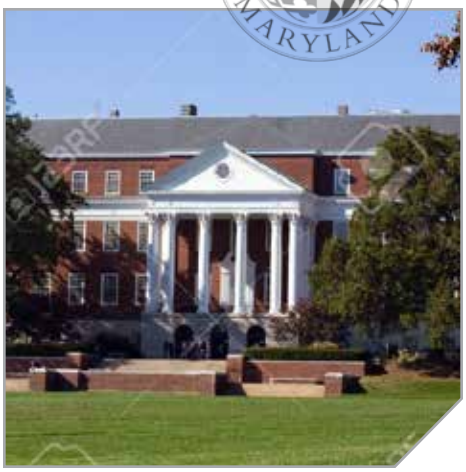
Cool Effect sells carbon credits from 1 tonne to many tonnes. There are other options located throughout the U.S. and Europe that can be found through an internet search.

Go to CoolEffect.org

What should we do after we obtain credits to maximize our impact?

Use your networks to have a greater effect Communicate in your university paper, to departments, to your community, and to other universities. Discuss the social and environmental benefits of your credits in addition to the climate benefit. Share your efforts in the classroom! Transparently describe the process you took to ensure credibility; try to visit or speak by phone with project operators if possible. Combine your communication efforts around carbon credits with on-site sustainability actions.

Support policymakers Find channels to inform policymakers at the city and state levels of your accomplishments in reducing emissions. This will allow you to receive credit where it is due and to nest your actions in larger commitments.



University of Maryland Using 2005 as the basis, the University of Maryland committed to cut emissions in half by 2025 and to achieve comprehensive net zero by 2050 from power, commuting, air travel, solid waste, land use, and other sources. Beginning in 2018, the university also offset 100% of business, study abroad, and athletic air travel.

Can our university create our own carbon credit project?

Yes, it is possible to do so and this can be an excellent student learning opportunity, but it requires both funding and planning. Many universities have their own carbon credit projects, including University of Wisconsin, Rochester Institute of Technology, and University of Illinois Urbana-Champaign.[15]

Often it is easier to start by purchasing carbon credits and learning about good carbon credit projects before creating your own. This is because starting a project has a steep learning curve tankes several years, and can be costly. Requirements include field and laboratory testing, project design documentation, validation, monitoring, verification, and approval of credits for issuance. Projects can often be very small in scale and therefore the income generated might not outweigh the costs of operation, verification and credit issuance.

It will also be important to partner with a solid on-the-ground operator who can ensure continued operation of the project despite the academic calendar and the entrance and departure of students moving through the program.

Some questions to answer prior to initiating your own carbon emission reduction project:

- Do you have the capacity, financial resource and up-front capital required to execute?
- What is the potential academic and career enhancement?
- Can it help improve recruitment?
- Can you attract research dollars? What is the potential accessibility of grants?
- Is there an existing project in your area registered under an international standard for voluntary emissions that could be scaled with your help?
- What is the emission reduction impact of a new project vs. another option?
- Is there an opportunity to partner with a larger greenhouse gas initiative?

Source: Second Nature, Project Evaluation, https://secondnature.org/climate-guidance/sustainability-planning-and-climate-action-guide/building-blocks-for-sustainability-planning-and-climate-action/carbon-management-greenhouse-gas-mitigation/#transportation-solutions

[15]https://media.gm.com/content/dam/Media/images/US/Release_Images/2015/11-2015/Chevy-Carbon-Goal/Chevrolet-Carbon-38projects.pdf

How can I learn more?

To learn more about identifying and buying truly additional carbon credits that have been thoroughly audited, visit CoolEffect.org or contact us at info@cooleffect.org.

We are here to help.