

Co-Benefits of Carbon Offset Projects: Information for Carbon Offset Procurement

When directly reducing **greenhouse gas (GHG)** emissions on campus becomes extremely costly or unfeasible, universities may opt to purchase **verified carbon offsets**. In exchange for reducing their on-campus carbon footprint, universities can fund projects to reduce and remove GHG emissions from the atmosphere in other locations.



WHAT ARE CO-BENEFITS?

The benefits of carbon offsets go beyond emissions reduction. **Co-benefits are any positive impacts, other than direct GHG emissions mitigation, resulting from carbon offset projects.** This document highlights the positive impacts that can be generated by carbon offset projects, and how this may influence a college's or university's decision to purchase offsets.

WHAT ARE THE TYPES OF CO-BENEFITS?

The positive impacts of carbon offset projects can touch on many aspects of daily lives such as food, community, education, and economy. In addition to advancing university climate action plans, carbon offsets can give rise to regional socio-economic benefits and collectively advance the achievement of the

[United Nations Sustainable Development Goals \(SDGs\)](#). Most, if not all, co-benefits interact with one another, and therefore are achieved simultaneously when reducing carbon emissions.

In general, the co-benefits of carbon offset projects can be divided into four distinct categories.

EDUCATIONAL CO-BENEFITS



ENVIRONMENTAL CO-BENEFITS



ECONOMIC CO-BENEFITS



SOCIAL CO-BENEFITS





EDUCATIONAL CO-BENEFITS

LOCAL EDUCATIONAL BENEFITS

Carbon offsets projects, especially those located in less developed nations, often introduce new technology to a region.¹ As a result, project developers must seek resources to facilitate technology transfers and to train the local workforce in how to operate the new technology. This operations training can help the local workforce to develop highly unique technical skills.

To other stakeholders in the community, offset projects present an opportunity to learn more about carbon mitigation measures and climate change adaptation. They can help improve climate literacy and environmental awareness within the community and region, which can spearhead other emissions reduction projects as well as the development of national climate adaptation and resiliency plans. For example, in the [Gazi-Kwale County of Kenya](#), a mangrove restoration carbon offset project has served as a teaching mechanism to promote environmental awareness and recognition for the value of mangrove forest resources in primary and secondary schools.²

CAMPUS EDUCATIONAL BENEFITS

For college and university faculty members, offset projects can serve as a teaching platform, not just in the subjects of sustainability, climate change, or environmental issues, but also in business and entrepreneurship. Offset projects represent an opportunity for students to learn about the mechanisms that guide the voluntary carbon market and carbon financing. By investing in offset projects that are geographically close to academic institutions, professors and instructors can incorporate projects into their curriculum or organize site-visits with students as part of their coursework.



For example, American University, which became carbon neutral in 2018, invests in offset programs in Kenya through [The Paradigm Project](#). American University has a study abroad center in Nairobi; the Paradigm Project counteracts emissions associated with study abroad air travel while also deepening connections with Kenyan communities and providing students an example of sustainable development.³

¹ Yiannis Kountouris, Zen Makuch, and E Feng Tan Loh, "Quantification and Evaluation of the Voluntary Market's Co-Benefits," 2014.

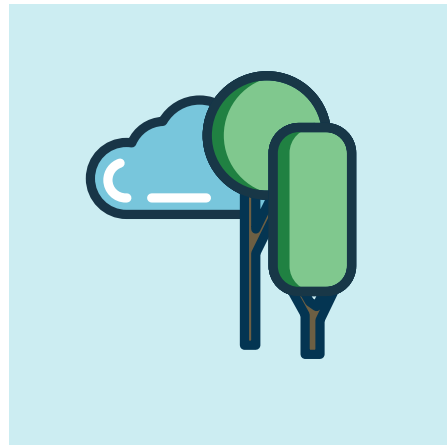
² Dorothee Herr et al., "An Analysis of the Potential Positive and Negative Livelihood Impacts of Coastal Carbon Offset Projects," *Journal of Environmental Management* 235 (April 1, 2019): 463–79, <https://doi.org/10.1016/j.jenvman.2019.01.067>.

³ "AU Invests in Project Offsetting Study Abroad-Related Travel Emissions," American University, 2017, <https://www.american.edu/finance/news/sustainability-offset-study-abroad.cfm>.

ENVIRONMENTAL CO-BENEFITS

AIR QUALITY BENEFITS

Some emissions reduction projects may also address regional and household air pollution by reducing non-GHG pollutants, such as **Black Carbon (BC)**. BC is emitted with CO₂ during incomplete combustion of fossil fuels and biomass⁴ in vehicles, household energy devices, and energy systems.



In homes that lack access to modern cooking facilities, households often resort to cooking over **open fires and inefficient cookstoves**.⁵ Without proper kitchen ventilation, burning solid fuel can result in household air pollution, including BC. Prolonged exposure to BC puts household mem-

bers at risk of developing diseases such as respiratory infections, lung inflammation, and cancer. Household air pollution contributes to the premature deaths of almost four million people every year.⁶ Carbon offset programs that distribute energy-efficient and clean fuel cookstoves to rural communities can help reduce indoor pollutant concentration by 40% to 100%.⁷ For example, Colgate University, which became carbon neutral in 2019, purchases carbon offsets from the **Danjiang River Solar Cookers** project in China. This project displaces traditional inefficient coal-fired stoves with solar-powered cookers.^{8,9} The reduced coal consumption results in improved indoor air quality and less risk of respiratory disease for participating households.

Meanwhile, diesel freight transport is another major source of BC, with trucks in particular accountable for 78% of global BC emissions from diesel road fleet.¹⁰ Freight-renewal offset projects incentivize transport operators to replace older modes of transportation with newer and energy-efficient fleets. In addition to reducing fossil fuel consumption and lowering carbon emissions, these projects address BC emissions, which leads to immediate local air quality improvements.^{11,12}



- 4 Ralph Sims, Virginia Gorsevski, and Susan Anenberg, "Black Carbon Mitigation and the Role of the Global Environment Facility: A STAP Advisory Document" (Washington, D.C., 2015), 13, <http://www.stapgef.org>.
- 5 Clean Cooking Alliance, Bridge Collaboration, and PATH, "Cross-Sectoral Collaboration for Clean Cooking: Overview and Recommendations," 2019
- 6 "Household Air Pollution and Health," World Health Organization, 2018, <https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health>
- 7 Kountouris, Makuch, and Loh, "Quantification and Evaluation of the Voluntary Market's Co-Benefits."
- 8 "Danjiang River Solar Cookers," Natural Capital Partners, Accessed August 25, <https://www.naturalcapitalpartners.com/projects/project/danjiang-river-solar-cookers>
- 9 "New Offset Projects Bolster Sustainability Domestically and Internationally," Colgate University, 2019, <https://www.colgate.edu/news/stories/new-offset-projects-bolster-sustainability-domestically-and-internationally>.
- 10 Suzanne Greene and Cristiano Façanha, "Carbon Offsets for Freight Transport Decarbonization," Nature Sustainability (Nature Research, November 1, 2019), <https://doi.org/10.1038/s41893-019-0413-0>.
- 11 Greene and Façanha, "Carbon Offsets for Freight."
- 12 Sims, Gorsevski, and Anenberg, "Black Carbon Mitigation," 14.

ENVIRONMENTAL CO-BENEFITS (CONTINUED)



BIODIVERSITY BENEFITS

Land-Use, Land-Use Change, and Forestry (LULUCF) projects are currently one of the most popular types of carbon offset. In 2018 LULUCF projects represented the highest volume of offsets sold, eliminating 50.7 million metric tons of CO₂ equivalent (MtCO₂e) from the atmosphere.¹³ Forest and land-use projects, including **Reducing Emissions from Deforestation and Forest Degradation (REDD+)**, generate direct biodiversity benefits besides carbon sequestration. Forests maintain ecological balance in pollination, seed dispersal, and germination, as well as plant regeneration and growth.

Forests also preserve wildlife and their habitats, and contain unique plants that may face extinction.

The **UPM Blandin Native American Hardwoods Conservation Project** in Minnesota provides an example of the biodiversity co-benefits of forestry carbon offset projects. UPM Communication Papers sources timber from 188,000 acres of private forest land in Minnesota that is under a conservation easement and certified by the Sustainable Forestry Initiative. While increasing carbon sequestration, the project maintains water quality, provides public access to recreation opportunities for the local community, and protects wildlife habitat, including 47 species of birds and over 30 species of mammals.¹⁴

However, carbon offset buyers should note that not all LULUCF projects are equal, and some may not provide the same co-benefits. For example, researchers are investigating oversight of defaunation in REDD+ projects that rely mostly on remote sensing.¹⁵ In some cases, remote sensing is unable to detect human disturbances such as hunting. If REDD+ projects fail to address overhunting in their methodologies, this could undermine biodiversity conservation claims of LULUCF offset schemes.

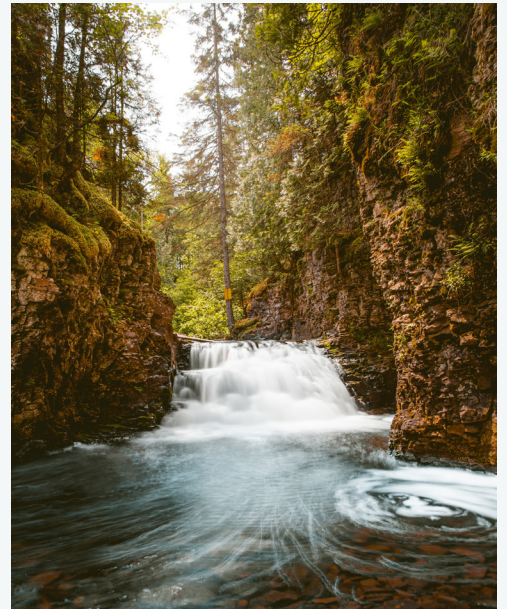


Photo by Josh Hild on Unsplash

¹³ Forest Trends' Ecosystem Marketplace, "Financing Emissions Reductions for the Future: State of the Voluntary Carbon Markets 2019" (Washington D.C., 2019), <https://app.hubspot.com/documents/3298623/view/63001900?accessId=eb4b1a>.

¹⁴ "UPM Blandin Native American Hardwoods Conservation Project," 3Degrees, accessed August 25, 2020, <https://3degreesinc.com/resources/blandin-conservation-project/>

¹⁵ Torsten Krause and Martin Reinhardt Nielsen, "Not Seeing the Forest for the Trees: The Oversight of Defaunation in REDD+ and Global Forest Governance," *Forests* 10, no. 4 (April 18, 2019): 344, <https://doi.org/10.3390/f10040344>.



ECONOMIC CO-BENEFITS

CREATING AN INCLUSIVE ECONOMY

Purchasing carbon credits from projects based in marginalized communities can promote an inclusive economy. For example, in Australia, the Australian Government encourages farmers to partake in carbon farming. In exchange for increasing carbon sequestration or reducing GHG emissions on land, farmers, including those in indigenous communities, receive **Australian Carbon Credit Units (ACCUs)**. The **Aboriginal Carbon Foundation (AbCF)** ensures ACCUs are ethically traded and deliver socio-economic and environmental benefits directly to indigenous communities.¹⁶ Participating in carbon farming presents an opportunity for Aboriginal Australians to not

only fight against climate change as a collective but also to build wealth for their communities.

JOB CREATION AND INCREASE IN LIVELIHOOD

Another potential economic co-benefit of carbon offset schemes is the generation of employment opportunities in local communities. For example, the **Mikoko Pamoja** project in the Gazi bay of Kenya has created both long-term and short-term job opportunities for locals to generate private income. The mangrove restoration project requires program coordinators, forest rangers and guards, as well as forest technicians. Furthermore, offset credits issued from the project are wholly owned by the community, with yields channeled into a revolving community fund managed by villagers.¹⁷ With a steady stream of revenue entering the local economy, the communities of Gazi and Makongeni can improve local infrastructures for public benefit. Recently, villagers have purchased textbooks and sports equipment for local schools, as well as installed water facilities.¹⁸

In the United States, although the **Tri-City Forest Project** does not generate local jobs directly, it provides an alternative source of much-needed income for residents of Holyoke, West Springfield, and Westfield, Massachusetts. The project is a collaborative effort between the three cities to improve forest management across 6,500 acres of public land.¹⁹ The initiative not only protects the habitats of rare or threatened species surrounding a critical watershed, it also sequesters approximately 122,000 MtCO₂e every year.²⁰ In return, the local municipalities receive an additional source of revenue from the sale of carbon credits. Similarly, Dickinson College, which became carbon neutral in 2020, works with the **Nature Conservancy's Working Woodlands** program to purchase carbon offsets from a sustainable forest management project in Pennsylvania.²¹ Along with environmental benefits the program creates a new source of revenue for landowners, which can increase over time as landowners improve their forest management practices.

¹⁶ "Aboriginal Carbon Foundation," accessed April 23, 2020, <https://www.abcfoundation.org.au/>.

¹⁷ Herr et al., "Analysis of the Potential."

¹⁸ "Indonesia: Mangroves Spurring New Businesses," Livelihood Funds, accessed April 23, 2020, <http://www.livelihoods.eu/indonesia-mangroves-spurring-new-businesses/>.

¹⁹ Jim Kinney, "West Springfield, Holyoke, Westfield Anticipate \$2M from Carbon Credit Program Preserving Forests, Watershed," *MassLive*, July 15, 2019, <https://www.masslive.com/news/2019/07/west-springfield-holyoke-westfield-anticipate-2m-from-carbon-credit-program-preserving-forests-watershed.html>.

²⁰ "Tri-City Forest Project," Cool Effect, accessed August 18, 2020, <https://www.cooleffect.org/content/project/tri-city-forest-project>.

²¹ "Carbon Offsets," Dickinson College, accessed August 25, 2020 https://www.dickinson.edu/homepage/1370/carbon_offsets

SOCIAL CO-BENEFITS

PROMOTING GENDER EQUALITY

Carbon offset projects may also help women overcome socio-economic challenges associated with gender disparities. In many poor and low-income communities, women spend a significant amount of time preparing food for their families. With improper ventilation, cooking on traditional cookstoves leaves female household members more vulnerable to respiratory diseases. Initiatives like the [Clean Cooking Alliance](#) aim to address the implications of cooking on health and livelihoods of women and children.²² With modern cookstoves, women can also save time and energy to participate in paid activities that generate side-income.

Women in Asia and Africa, where the majority of employed women are engaged in agricultural practices²³, are disproportionately affected by climate change. Extreme weather conditions and increasing global temperatures have impeded food production, causing not only food scarcity but also economic and income losses. Due to socio-cultural restrictions that are enforced on gender norms, female farmers often bear the brunt of climate change impacts and become more susceptible to income and production shocks.²⁴ As a consequence, they are at risk of losing their financial autonomy if they are unable to harvest and sell produce. However, carbon offset projects may provide a means to compensate for these losses. For example, through the restoration of mangrove forests in Sumatra, Indonesia under the [Yagasu Project](#), women have the opportunity to serve in management roles. In addition to establishing and managing a village revolving fund, women have also participated in town hall meetings to discuss local business development.²⁵



Photo by Ninno Jack Jr on Unsplash

²² "Clean Cooking Alliance: Stoves," accessed April 23, 2020, <https://www.cleancookingalliance.org/technology-and-fuels/stoves/>.

²³ UN Women, "Turning Promises Into Action."

²⁴ Panagiotis Karfakis, Leslie Lipper, and Mark Smulders, "The Assessment of the Socio-Economic Impacts of Climate Change at Household Level and Policy Implications" in *Building resilience for adaptation to climate change in the agriculture sector*, ed. Food and Agricultural Organization of the United Nations (Rome, 2013), 138.

²⁵ Herr et al., "Analysis of the Potential"

SUSTAINABLE DEVELOPMENT GOALS

High-quality emission reduction projects are often linked to the SDGs, and many project developers organize their projects and co-benefits around these goals. For example, the Clean Cooking Alliance established several links between the co-benefits of providing clean and modern cookstoves with the SDGs, claiming to advance 10 of 17 goals. As a response, third-party verification standards have also introduced new and additional protocols to verify and quantify SDG

impacts from carbon offset schemes. For example, the [Gold Standard for Global Goals](#) developed standards and requirements to ensure programs, including emission reduction projects, deliver maximum positive impacts on climate and development. Similarly, [Verra's Sustainable Development Verified Impact Standard \(SD Vista\)](#) sets out requirements and criteria to develop, maintain, and evaluate projects that aim to deliver high-impact sustainable development benefits.

HOW DO CO-BENEFITS AFFECT OFFSET PRICES?

Due to the nature of the voluntary carbon market, the price of an offset is effectively determined by market supply and demand. Additionally, offset prices may also reflect other preferential factors such as the type of projects, volume of buyers, the type of co-benefits, and the type of verification certification.

It is estimated that for every metric ton of CO₂e removed from the atmosphere, carbon offset schemes can deliver up to \$600 worth of co-benefits.²⁶ Buyers are increasingly drawn to, and willing to pay more for, dual-certified projects that verify both the emissions reductions and the co-benefits. Projects

with substantial socio-economic impacts in particular are highly valued and priced higher than projects with environmental co-benefits. In addition to upholding the environmental integrity of carbon offset schemes, the associated co-benefits must also be verified and quantified for additionality and permanence. A growing number of third-party verification bodies have introduced standards to verify the co-benefits associated with offset projects, namely the [Gold Standard for Global Goals](#) and the [Verified Carbon Standard with Climate, Community, and Biodiversity Standards](#).

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²⁶ Kountouris, Makuch, and Loh, "Quantification and Evaluation"