



UNIVERSITY OF VIRGINIA

**CARBON OFFSETS AND
REMOVALS FRAMEWORK**

TASK FORCE REPORT 2023

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EXECUTIVE SUMMARY

Background

In 2020, the University of Virginia finalized and published its [2030 Sustainability Plan](#), which includes commitments to be carbon neutral by 2030 and fossil fuel-free by 2050. UVA continues to make steady progress towards meeting the [university's climate goals](#), with a [44.6% reduction](#) as of 2022 in carbon emissions since 2010, despite growth in physical footprint and population. Further reductions planned include efficiency improvements to the university's energy supply (such as geoexchange, low temperature hot water and heat recovery chillers) and building energy efficiency (particularly in high-intensity spaces such as research labs and health system clinics). The university's primary climate neutrality approach focuses on direct reductions - strategies that can be implemented on Grounds - because of their impact and cost-effectiveness. The second approach looks towards renewable energy. With these strategies and anticipated improvements in the regional electrical grid, the university currently expects to be able to significantly reduce emissions. As with many other universities, the UVA has previously stated that [carbon offsets](#) will be a last resort, if used at all, in meeting its goals.

However, there will be some emissions that cannot be fully mitigated on Grounds. Additionally, as UVA schools, units, and affiliated organizations implement emissions reduction strategies to meet a variety of climate objectives, and as some begin to purchase offsets, [questions regarding the validity](#) and impact of purchasing carbon offsets to meet these objectives continue to arise. In theory, carbon offset credits provide an opportunity to reduce emissions at lower cost. However, there is [considerable skepticism](#) about whether carbon offset credits can meaningfully contribute to climate change mitigation. There is [growing consensus](#) that offsets should not be used to make claims about carbon emissions reductions because they are an ineffective, and sometimes counterproductive, solution.

Task Force Evaluation

To evaluate these issues, in late October 2022, the University Committee on Sustainability appointed a Carbon Offsets Task Force (Task Force), based on members' valuable expertise and insight, to make recommendations on a framework for the university, with ongoing, periodic review of UVA's carbon offset strategy. The Task Force developed recommendations based on their subject matter expertise, benchmarking, literature review, and alignment with UVA's goals. These recommendations were presented to and approved by the President's Executive Review Team (PERT) in fall 2023.

Two fundamental issues associated with carbon offsets are (1) additionality (emissions reductions or removals are only "additional" if the project or activity would not have happened without the added incentive provided by the carbon credits; additionality can never be guaranteed); and (2) lack of permanence (it is necessary that carbon offsets result in permanent reductions in emissions because the carbon emissions they are offsetting remain in the atmosphere for hundreds of years). However, in contrast to carbon offset projects, carbon removal project credits, such as credits generated from direct air capture technologies that

extract and store emissions directly from the atmosphere and store them deep underground, are more credible and more likely to result in real emissions reductions.

UVA Carbon Removals Carbon Offsets Framework

This framework is in line with several aspects of the [Oxford Principles for Net Zero Aligned Offsetting](#): “...guidance has emerged and converged significantly across international net zero initiatives and standards on definitions of net zero and related terms and targets. Such guidance emphasizes that organisations must focus on urgently reducing emissions within their value chain (Scopes 1, 2, and 3) and fund high quality, durable **removals** to balance any residual emissions.”

First - Direct, On-Grounds Reductions: Before considering external carbon reduction projects, university schools and units are asked to demonstrate that they have first made all efforts to directly reduce emissions without purchasing carbon credits. This will ensure that UVA’s first and primary course of action is to reduce emissions through optimization, resource conservation, and energy efficiency. These strategies are typically the most cost-effective and often provide co-benefits related to human health, productivity, and broader environmental sustainability. The [2030 Sustainability Plan](#) includes an accountability-related strategic action that encourages schools and units to develop school and unit-level action plans that align with the UVA 2030 Great and Good plan’s sustainability goals, the UVA 2020-2030 Sustainability Plan, and sustainability action plans.

Second - Renewable Energy: Schools and units should engage with Facilities Management and the Office for Sustainability to (1) ensure all viable direct emissions reduction opportunities have been pursued, and (2) identify high quality, vetted opportunities for indirect emissions reductions through off-site renewable energy procurement for electricity emissions, if desired.

Third - Carbon Removal Projects: For any remaining emissions, schools and units may purchase high-quality, vetted carbon removal projects (not carbon offset projects) that [have been identified by Giving Green](#), an organization that uses robust research and data analytics to identify high-impact projects. These must be purchased centrally, through UVA Facilities Management Finance, to help ensure that carbon reduction-related projects that affiliates would like to pursue can be vetted by the university.

University funds (including student fees) should not be used to purchase removals or offsets outside of this university framework, and university schools and units should not make claims or statements about carbon removals, offsets, or neutrality achieved or emissions reduced unless this framework is followed. Ensuring carbon credits are meaningful, valid, and high-impact, mitigates financial and reputational risks to the university.

The carbon offset and carbon removal market is rapidly advancing, so these recommendations will be revisited annually to ensure that the university’s approach is based on the best information currently available. The UVA Sustainability website will be updated as additional resources are developed.

BACKGROUND

Reducing greenhouse gas emissions is imperative. The UN Environment Programme estimated that staying below 1.5°C, in line with the climate goals set out in the Paris agreement, will require a 55% reduction in greenhouse gas emissions, almost twice as much as the 30% cut needed to stay below 2°C of warming (UNEP, 2021). The most recent, international scientific assessment warns that "All global modelled pathways that limit warming to 1.5°C ... and those that limit warming to 2°C ... involve rapid and deep and, in most cases, immediate greenhouse gas emissions reductions in all sectors this decade." (IPCC, AR6 Synthesis Report, 2023). IPCC Chair Hoesung Lee recently advised that "The pace and scale of what has been done so far and current plans are insufficient.... We are walking when we should be sprinting." (NYT, March 21, 2023).

As noted by the [Oxford Principles for Net Zero Aligned Offsetting](#): "Following the UAE Consensus at COP28 on "transitioning away from fossil fuels in energy systems," organisations with net zero commitments need to prioritise early investment in renewable energy and improved energy efficiency within their own value chains, while at the same time recognising that, as the world transitions, it will become ever more important to demonstrate that carbon credits used for offsetting are genuinely additional to reductions and removals that would have occurred anyway."

Carbon Offsets

Carbon offsets, broadly, describe tradable credits that represent one metric ton of carbon dioxide equivalent (1 mtCO₂e) emissions reductions. The underlying principle is that the offset purchaser is paying the offset creator to engage in an emissions reduction activity. The carbon reduction impact of this transaction, therefore, relies on a reduction in total emissions relative to a counterfactual where no transaction occurred – a concept known as additionality. The changed condition also depends on the emissions reduction remaining permanent over time -- a concept known as durability. Due to this relative nature, a carbon offset that is not additional and durable is a worthless transaction from a GHG mitigation point of view. Unfortunately, the nature of a counterfactual is that it is very difficult to prove. This conundrum is one of several risks that characterize the current carbon offset market.

Carbon Offsets — Issues and Risks

According to the [Oxford Principles for Net Zero Aligned Offsetting](#), "In the past few years, analyses of the most common types of carbon credit projects have found evidence of over-crediting that undermines climate change mitigation efforts. Furthermore, the supply of credible removals is still far from sufficiently scaled. In recognition of these challenges, organisations and standard bodies have opted to move away from the term 'offsetting' to avoid misleading claims."

The global nature of climate change makes it a very difficult problem to solve. While most environmental externalities are local, e.g., air pollution emitted in Charlottesville affects air quality and health in

Charlottesville, climate change is unusual in that it is a global externality — a ton of CO₂ emissions influences climate change in Charlottesville, regardless of whether it was emitted in Charlottesville or elsewhere. However, there is also a positive way of looking at the global nature of climate change. Because atmospheric CO₂ decreases by the same amount whether reductions happen in Charlottesville or across the globe, stakeholders that want to reduce emissions can look beyond their own activities for more cost-effective ways to reduce emissions. A popular way of doing this is to use carbon offsets.

In theory, carbon offset schemes provide an opportunity to reduce emissions at lower cost. However, there is considerable skepticism about whether carbon offset credits can meaningfully contribute to climate change mitigation and as explained below, may inadvertently delay or discourage some direct emissions reductions.

The two fundamental issues associated with carbon offsets are:

Additionality: Emissions reductions or removals are only “additional” if the project or activity would not have happened without the added incentive provided by the carbon credits. Providing carbon credits to projects that would have been implemented anyway delivers zero climate mitigation. This is a serious challenge for carbon offset markets because additionality is not measurable, despite industry claims. It is a counterfactual concept, which requires us to infer what would have happened if the project didn’t exist. Additionality can never be guaranteed.

Lack of Permanence: It is necessary that carbon offsets result in permanent reductions in emissions because the carbon emissions they are offsetting remain in the atmosphere for hundreds of years. There are two types of carbon credits: those that reduce the amount of carbon that is emitted, and those that remove carbon from the atmosphere. In the case of reductions, net emissions remain positive. Even though the supplier of the carbon credit has zero emissions, the buyer continues to emit. By contrast, carbon removal credits have the potential to deliver net-zero emissions if permanence is satisfied. Permanence is a reasonable assumption for carbon removal credits generated from direct air capture technologies, which extract and store emissions directly from the atmosphere and store them deep underground. Permanence is less credible in the context of forest growth credits. Even when landowners commit not to cut down trees, wildfires, disease, and active reversal decisions ultimately release much of their stored carbon back into the atmosphere.

Even in the case that carbon offsets deliver additional and permanent reductions in emissions, there are concerns that market **leakage** will undermine the climate benefits. For example, the choice by a landowner to not fell timber, increases demand for timber, resulting in an increase in felling by other landowners, offsetting the offset. Finally, there are concerns that the use of carbon offsets may induce **moral hazard**, whereby the insurance provided by offsets either results in active choices to continue engaging in high-carbon activities, that otherwise would not have been pursued, or delayed investments to reduce emissions from existing sources.

Avoided Emissions

Carbon credits can be generally grouped into two major categories: avoided emissions (or emission reduction) and carbon removals, as illustrated in Figure 1 below. Avoided emissions strategies rely on interventions that reduce emissions from a business-as-usual scenario, such as methane capture or avoided deforestation. In principle, these strategies appear to be effective levers to reduce GHG emissions. In practice, however, avoided emissions projects are susceptible to manipulation and their additionality assertions remain difficult to verify. Due to the associated risks, the university and its affiliates should not pursue avoided emissions type carbon offsets as an emissions reduction strategy.

Carbon Removal

Carbon removal (or carbon dioxide removal, CDR) strategies are distinguished from avoided emissions in that these initiatives remove CO₂ from the atmosphere (as opposed to “avoiding” its release into the atmosphere). Removing carbon from the atmosphere in this way can also be described as negative emissions, since the GHG fluxes are moving in the opposite direction to typical anthropogenic emissions (avoided emissions, however, should not be considered negative emissions). The additionality of carbon removal strategies such as reforestation and direct air capture can often be estimated with greater confidence than avoided emissions offsets (more information provided by [Carbon Plan](#)). The more apparent counterfactual of carbon removal strategies such as reforestation and direct air capture (DAC) allow these types of offsets to avoid some of the pitfalls associated with additionality and leakage risks. That being said, there remains a limited supply of carbon removal projects – leading to higher overall costs. Given the high cost of permanent, carbon removal type offsets, it is more prudent for the university to invest in long-term initiatives related to operational energy efficiency, electrification, and renewable energy procurement, to the extent possible.

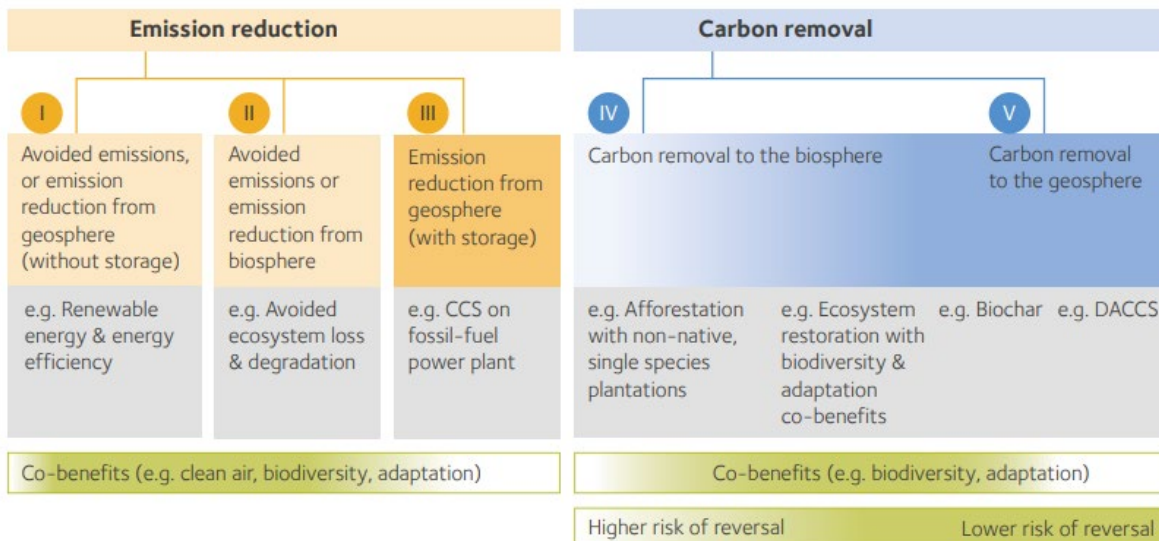


Figure 1: Taxonomy of Carbon Offsets ([Oxford Principles for Net Zero Aligned Carbon Offsetting](#))

According to the [Oxford Principles for Net Zero Aligned Offsetting](#), “Most credits in the voluntary market today are associated with emission reductions or avoided emissions. These can play a key role in the short and medium term to protect the carbon stored in vulnerable ecosystems and accelerate the transition to a low-carbon society, but the scope for further emission reductions will decrease as we approach the net zero target date. **Organisations must shift towards carbon removals**, which remove carbon from the atmosphere to counterbalance residual emissions and achieve net zero.”

Renewable Energy Credits

Renewable energy credits (RECs) are tradable instruments that represent the environmental attributes of renewable electricity generation. In this way, REC ownership is a prerequisite for any claims of carbon reductions related to renewable energy consumption. RECs are different from carbon offsets and can only be used to reduce the carbon emissions associated with Scope 2 electricity consumption (i.e., RECs cannot offset on-site fossil fuel emissions). Furthermore, RECs have a different set of benefits and risks compared to offsets, including no requirement for additionality (more information provided by the [U.S. EPA](#)). The university should continue to procure additional renewable energy generation and retire the associated (i.e., “bundled”) RECs. Due to additionality concerns, however, the university and its affiliates should not pursue unbundled RECs as an emissions reduction strategy, except for scope 2 emissions.

Compliance Markets

Compliance (or mandatory) markets (often referred to as “cap and trade” or “cap and invest” programs) are created and regulated by law at the subnational (e.g., the Regional Greenhouse Gas Initiative, RGGI), national, or international level. Compliance markets specify a cap on the mass of emissions over some relevant time period and provide that emission “allowances” may be traded among regulated emissions sources (such as a power plant) in conjunction with the market-wide emissions cap.

UVA’s Climate Goals and Footprint

UVA’s carbon neutrality goal and carbon footprint includes emissions related to the functional operation of the university. This best aligns with the Greenhouse Gas Protocol’s Operational Control Approach, which includes emission sources UVA has the authority to affect through operating policies and initiatives. UVA’s greenhouse gas (GHG) emissions are generated from four distinct sources: Fuel, Transportation, Electricity, and Operations Support. Fuel includes coal, natural gas, distillate oil, and propane used on Grounds. Transportation includes direct emissions from UVA-owned buses, fleet vehicles and jet. Electricity emissions are the result of electricity purchased from the electrical grid. Operations Support includes greenhouse gas emissions from fertilizer and refrigerants.

In greenhouse gas inventory terms, this means that UVA’s carbon goal includes all emissions for Scope 1 (fuel, fleet transportation, fertilizer, and refrigerants) and Scope 2 (purchased electricity). Scope 3 emissions are also an important part of UVA’s climate action strategies, such as faculty, staff and student commuting, business air travel, and student study abroad. UVA’s scope 3 inventory tracking will continue to

expand and improve as more data continue to be collected and as methodology for calculations become more robust. More information can be found on [UVA's Climate Goal FAQ's webpage](#) and the latest [GHG inventory report](#).

UVA's greenhouse gas inventory is calculated each calendar year, measured against a 2010 baseline, using the web-based [Sustainability Indicator Management & Analysis Platform](#) (SIMAP) developed by the University of New Hampshire. The methodologies in this third-party tool are aligned with the recommendations of the American College and University Presidents' Climate Commitment (ACUPCC) guidance, which refers to The Climate Registry's General Reporting Protocol and the World Resource Institutes' Greenhouse Gas Protocol Corporate Accounting and Reporting Standard. The calculation includes the metric ton of carbon dioxide equivalent for internationally-recognized greenhouse gases CO₂, CH₄, N₂O, and HFCs. For more detail see UVA's [annual UVA GHG Inventory reports](#).

TASK FORCE PROCESS

The Task Force focused its initial discussions around the credibility of using carbon offsets, regardless of objective (meeting a carbon-neutral goal or offsetting specific activities) or stakeholder group (university affiliates versus student groups). After the Task Force agreed that most carbon offsets are not currently credible and should not be used to offset university-related activities, the Task Force developed recommendations which were presented to and approved by the President's Executive Review Team (PERT) in fall 2023.

CARBON OFFSETS-CARBON REMOVALS TASK FORCE: KEY QUESTIONS

- How should the university respond to university affiliates looking for guidance to meet their own 2030 emissions reduction/carbon neutral/net-zero goals, including the consideration of carbon offsets? (These emissions are included in UVA's carbon neutrality goal).
- How should the university respond to university affiliates seeking to purchase carbon offsets to offset travel (other activities not included in UVA's goal, but part of UVA's inventory and important to address) for UVA-affiliated business?
- It has been determined that the university will have remaining 'scope 1' (from fuels burned on Grounds) carbon emissions in 2030 that likely cannot be eliminated through the primary course of action identified in the Climate Action Plan. How should the university address these remaining emissions?

OVERVIEW OF FINDINGS

The Task Force agrees that the university, university affiliates, and university stakeholders should:

- Review their approach, plan, and timeline for meeting their emissions objective or goal;
- First review all avenues for reducing or avoiding emissions related their objective or goal, directly on-Grounds within their timeframe;
- Not purchase carbon offsets, as carbon offsets are not a credible way to mitigate climate change and as a result provide a level of reputational and financial risk to the purchaser and the institution. Carbon removal purchases are acceptable as described below;
- If further reductions are needed at the school, unit, affiliate, or university level, university affiliates should engage the Office for Sustainability and Facilities Management to (a) ensure all viable direct, on-Grounds emissions reduction opportunities have been pursued, and (b) identify high quality, vetted opportunities for indirect emissions reductions through off-site renewable energy

procurement (scope 2 – electricity emissions only), and c) if the university affiliate is interested in further action, the only “offset” purchase that can be made are high quality, vetted carbon removal projects (not carbon offset projects) that have been identified by [Giving Green](#). Purchases must be made through centrally, through UVA FM Finance;

- Carbon removal purchases must be made using unrestricted fund sources; university affiliates should contact Facilities Management Finance if they have questions about whether their intended fund source is appropriate. UVA Finance can assist with identifying acceptable sources;
- University affiliates shall not make claims or statements (on UVA websites, social media, newsletters, etc.) about carbon removals, offsets, or neutrality achieved through the purchase of offsets/removals unless these recommendations for renewable energy procurement (scope 2 – electricity only) or procuring high-quality carbon removals (currently only via Giving Green) are followed, regardless of the source of funds. If other vendors or approaches are later determined to be credible and reliable, the Task Force may consider adding others.

Based on UVA’s 2030 Climate Action Plan, the university anticipates having some remaining Scope 1 emissions in 2030 that cannot be eliminated through on-Grounds reductions. UVA’s primary focus continues to be on direct emissions reductions on Grounds through district energy system efficiency, fuel switching (or electrification), and building efficiency, with renewable energy as a secondary strategy, but after those approaches have reached their limit, strategies such as carbon removals will need to be considered.

These recommendations will be updated annually, and much is likely to change before 2030, but as of now, the above carbon removal requirements would apply to these remaining emissions.

GUIDANCE FOR SCHOOLS AND UNITS

UVA's carbon neutrality goal and carbon footprint includes emissions related to the functional operation of the university. This best aligns with The Greenhouse Gas Protocol's Operational Control Approach, which includes emission sources UVA has the authority to affect through operating policies and initiatives. UVA's carbon emissions are generated from four distinct sources: Fuel, Transportation, Electricity, and Operations Support. Fuel includes coal, natural gas, distillate oil, and propane used on Grounds. Transportation includes direct emissions from UVA-owned buses, fleet vehicles and jet. Electricity emissions are the result of electricity purchased from the electrical grid. Operations Support includes greenhouse gas emissions from fertilizer and refrigerants.

In greenhouse gas inventory terms, this means that UVA's carbon goal includes all emissions for Scope 1 (fuel, fleet transportation, fertilizer, and refrigerants) and Scope 2 (purchased electricity). UVA also tracks and implements strategies for indirect emissions, known as Scope 3 emissions in its inventory, such as faculty, staff and student commuting, business air travel, and student study abroad, as these are important aspects of climate action.

EMISSIONS REDUCTIONS – SCHOOL AND UNIT LEVEL

See pages 10-11 for an overview of findings and summary guidance.

After a university affiliate has made all efforts to reduce emissions in their operations, scope 2 emissions (electricity) may be mitigated through the procurement of renewable energy or RECs, which should be coordinated through Facilities Management and the Office for Sustainability. If the school or unit is interested in further emissions reductions, they may purchase carbon removal credits to further progress towards decarbonization strategies. Only removal projects that have been identified by [Giving Green](#) can be purchased at this time. See Giving Green's recommended carbon removal providers [here](#).

The university needs a coordinated and centralized means of purchasing and tracking third-party carbon removals and renewable energy procurement, so **purchases must be managed centrally through UVA FM Finance, who will administer the purchase. Contact the Office for Sustainability for assistance.** University funds should not be used for carbon offsets and university funds should not be used to purchase removal credits outside of this process.

These can be claimed as literal emissions reductions by university affiliates. Affiliates should not publicize emissions reductions from any others carbon credits. If affiliates are interested in investing in offset projects but aren't interested in emissions reduction claims – and instead are interested in educational or other reasons, please coordinate with the Office for Sustainability. Per the [Oxford Principles for Net Zero Aligned Offsetting](#), "In response to heightened standards of integrity for climate claims, many actors and initiatives continue to purchase credits and support mitigation projects without using them to make net zero claims or to 'compensate' for ongoing emissions. While the Principles discuss net zero aligned offsetting,

we acknowledge there are many other reasons to buy credits and support mitigation projects other than to offset emissions, e.g., to pay for reductions in wider society or to restore ecosystems.”

COMMUNICATION

University affiliates shall not make claims or statements (on UVA websites, social media, newsletters, etc.) about carbon removals, offsets, or neutrality achieved through the purchase of offsets/removals or renewable energy unless these recommendations are followed (e.g., Giving Green recommendations for carbon removals), regardless of the source of funds. For approved carbon removals and renewable energy procurement, affiliates can state they have purchased carbon removals through (the Giving Green Provider selected), in the amount of (X) metric tons of carbon dioxide equivalent, to account for the un-avoided emissions (name/type - such as air travel, etc.).

Interested stakeholders who decide to purchase renewable energy or carbon removals (per the requirements above), must review the emissions reductions claims with the Office for Sustainability prior to publicizing.

ONGOING EDUCATION

University affiliates are asked to review UVA’s climate action materials, as they are shared, to understand the implications and limitations of carbon offset/removal purchases. These materials will be used when affiliates ask about purchasing carbon removal credits, as well for other general outreach, to raise awareness about UVA’s carbon footprint and climate action plan, and the weaknesses of offsets. The information will reiterate the focus on direct emissions reductions as a priority. For example, rather than purchasing removals for air travel to a conference, University affiliates might ask: (1) whether a conference can be attended virtually; (2) whether a closer conference within driving distance could serve as an alternative; or (3) if air travel is unavoidable, whether multiple events, meetings, conferences, and speaking engagements can be bundled together on a single trip. Other examples include athletic teams (club teams, IM-REC) coordinating playing multiple games on road trips, to reduce trips. Please contact the Office for Sustainability for other ideas.

APPENDIX A: TASK FORCE MEMBERSHIP

In late October 2022, the co-chairs of the University Committee on Sustainability appointed the following members, based on their valuable expertise and insight, to make recommendations for an initial carbon offsets framework for the university, with ongoing, periodic review of UVA's carbon offset and carbon removals strategy. The Task Force met virtually over the course of the 2022-2023 academic year to develop recommendations based on their subject matter expertise, benchmarking, literature review, and alignment with UVA goals.

Jonathan Colmer (Assistant Professor, Economics)

Madelyn Davis, Politics + Economics (BA, 2023)

Bill Define (Director of Financial Operations)

Cornelia Horner (UVIMCO Strategic Initiatives and Communications Lead)

Cale Jaffe (Professor of Law and Director of Environmental Law and Community Engagement Clinic)

Augie Maurelli (Associate Vice President for Financial Operations)

Andrea Trimble (Office for Sustainability)

Ethan Heil (Office for Sustainability)

Bill Shobe (Professor of Public Policy and Economics, Director – Center for Economics and Policy Studies)

Holly Sims, Environmental Science (BS 2023) + Batten (MS)

Paul Zmick (Director, Energy & Utilities)

APPENDIX B: BENCHMARKING AND RESOURCES

UVA Documents

- [2016-2017 UVA Offset Task Force Summary Report](#)
- [Voluntary Carbon Offsets and their Contribution to Carbon Neutrality Goals at the University of Virginia](#) - Environmental Law Clinic
- [Decarbonization Academy 2022 Report on Carbon Offsets](#) (Madelyn Davis, Politics + Economics (BA, 2023) and Holly Sims, Environmental Science (BS 2023) + Batten (MS))
- [Why Integrated Assessment Modeling of Negative Emissions Technologies Is Hard and How We Can Do Better](#) - Fuhrman et al., 2019

Principles

- [Oxford Principles for Net Zero Aligned Carbon Offsetting](#)
- [A White Paper from the Penn Center for Science, Sustainability, and the Media](#) - Joseph Romm, Ph.D.
- [Giving Green](#)
- [How to Think Beyond Net Zero](#) - Giving Green
- [Carbon Markets & Offsets Guidance](#) - Second Nature
- [A Guide to Using Carbon Offsets \(The Carbon Offset Guide\)](#) - Stockholm Environment Institute
- [The Carbon Neutral Protocol](#) - Natural Capital Partners
- [Negative Emissions Technologies and Reliable Sequestration](#) - National Academy of Sciences
- [Criteria for high-quality carbon dioxide removal](#) - Carbon Direct (for Microsoft)
- [Carbon Dioxide Removal Database](#) – Carbon Plan

Examples in Higher Education

- [The University of California has all but dropped carbon offsets and thinks you should too](#) – MIT Technology Review
- [University of Southern California Task Force on Carbon Removal and Offsets Final Report](#)
- [Voluntary Registry Offsets Database](#) – UC Berkeley
- [Duke Carbon Offsets Initiative](#)
- [Yale Carbon Offsets Strategy](#)
- [VCU Carver Community Forestry Offset Program](#)

- [University of Michigan Offsets Guidance \(p. 127\)](#)
- [University of Maryland Carbon Offsets Strategy](#)
- [Lessons for institutional climate action from U.S. higher education](#) – Barron et al.

Other Resources

- [Assessing the State of the Voluntary Carbon Market in 2022](#) - Carbon Direct
- [Systematic over-crediting of forest offsets \(publication\)](#) - Carbon Plan
- [Carbon Removal Mechanisms](#) – Carbon Plan
- [Carbon Dioxide Removal Primer](#) – CDR Primer
- [Do carbon offsets offset carbon?](#) - Calel et al.
- [The Economics of Carbon Accounting and Carbon Offsets](#) - Geoffrey Heal (NBER, 2022)
- [The Economics of Carbon Offsets](#) - James Bushnell (NBER, 2010)
- [Inside the billion-dollar market for junk carbon offsets](#) - Bloomberg