

How UNFCCC's COP Can Achieve Carbon Neutrality

[Natasha Dacic](#)¹, [Alexa B. White](#)², [Ranveer S. Ajimal](#)³,
[Katelyn M. Boisvert](#)^{4,5}, [Lunia E. Oriol](#)¹, [Sivah Akash](#)⁴

¹University of Michigan, Department of Climate and Space Sciences and Engineering, Ann Arbor, MI

²University of Michigan, Department of Ecology and Evolutionary Biology, Ann Arbor, MI

³University of Michigan, College of Literature, Science, and the Arts, Ann Arbor, MI

⁴University of Michigan, School for Environment and Sustainability, Ann Arbor, MI

⁵University of Michigan, Ross School of Business, Ann Arbor, MI

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Corresponding author: ndacic@umich.edu

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Abstract: International conferences such as the United Nations Framework Convention on Climate Change's (UNFCCC) Conference of the Parties (COP) attract over 25,000 attendees from around the world and have an alarming carbon footprint. Carbon neutral events have increased in popularity, and help to curb large amounts of emissions and slow climate change. We discuss techniques to reduce carbon emissions without settling for offsets from an individual and conference scale. The UNFCCC COP can reduce its overall emissions significantly by implementing a hybrid conference model and more sustainable conference choices. COP can lead the way in establishing a sustainable model to advance the climate agenda without exacerbating the global climate crisis.

I. Introduction

The Conference of the Parties (COP) is the supreme decision-making body of the countries (Parties) that have joined the United Nations Framework Convention on Climate Change (UNFCCC). The COP meets annually to discuss, debate, and negotiate on the overall goal of the UNFCCC, which is to limit climate change. Party delegates from all around the world attend the COP meetings in order to review contributions of each Party on how they plan to combat climate change. Ironically, the carbon footprint created by air travel from the tens of thousands of attendees seems to undermine the purpose of a climate change conference.

Carbon neutral events have increased in popularity to help curb greenhouse gas emissions created from large-scale events. Carbon neutral is a term used to describe where carbon emissions caused by an activity are balanced out by its removal in the form of payment or method (News European Parliament

2019). Often, carbon neutrality is achieved by carbon offsetting which is the activity that compensates for the emission of carbon dioxide (CO₂) by providing an emission reduction somewhere else (News European Parliament 2019).

This op-ed focuses on improving the carbon neutral nature of COP by reducing its dependence on offsets while offering alternatives that prevent emissions. COP26's offsets were purchased through UNFCCC-recognized offsets such as Certified Emission Reductions (CERS) (United Nations Climate Change 2021). Some examples of carbon offset COP projects are reforestation, forest regeneration, and replacements of fossil fuel generated electricity with renewable energy (United Nations Climate Change 2021).

Offsets are problematic because they do not target the direct source and, instead, offer an alternative such as planting trees that does not decrease

emissions significantly. It allows the actor to avoid directly reducing emissions or taking meaningful action. COP has made efforts to reduce its emissions before relying on offsets, but aggressive measures in reducing COP's massive carbon footprint need to be taken in a world facing a climate crisis.

We propose solutions for conferences to reduce carbon emissions and to host carbon neutral conferences. The recommendations provided do not form an exhaustive list. The article uses data from previous COPs as well as proxy data from other similar conferences. We discuss individual (Section II) and conference (Section III) scale actions that COP can pursue to reduce its carbon footprint. COP can lead the way in establishing a conference model that advances the climate agenda while reducing its carbon footprint.

II. Individual Scale Changes at COP

Factors such as transportation and food selection contribute to a conference's environmental impact. Section II proposes changes to COP that encourages individual attendees to limit their carbon footprint.

i. Transportation and Travel

Transportation accounts for approximately 24% of CO₂ emissions, yet it is difficult to decarbonize because it remains 92% reliant on oil (Teter, Tattini, and Petropoulos 2020; International Transport Forum 2020). Transportation is the fastest growing source of CO₂ in the world with greenhouse gas emissions from transportation expected to increase by 120% from 2000 to 2050 globally (Transport Matters 2015; International Transport Forum 2021). Many conference participants rely on some form of transportation, and the mode of choice directly influences the carbon intensity of the commute. Nearly 120 private jets carried world leaders to and from COP26, burning over 1,000 tons of CO₂. This choice of private travel is not only hypocritical to a climate conference but one of the most inefficient ways to travel (Williams 2021). Conferences can reduce emissions by rethinking their reliance on transportation. Public transportation uses three to four times less energy per passenger than

individual cars, while moving people in greater numbers (United Nations Climate Change 2018). Previous COPs have offered free public transportation for registered participants which should be continued and highly encouraged where possible (United Nations Climate Change 2017).

During the emergence of the COVID-19 pandemic, many large conferences quickly shifted to a virtual format. Although indirect emissions are created from electricity use of individual computers, the benefits of virtual conferences are favorable due to near-zero emissions from transportation. For example, attendance at the 2020 European Geophysical Union (EGU) rose from the previous average of 16,000 attendees to 26,000 virtual attendees. This suggests that online conferences are more accessible and affordable to participants when traveling is not required. However, negotiating on climate policy is difficult in a virtual format, especially when almost 200 countries are making climate change commitments. The face-to-face interactions that typically occur at COP are important for crunch negotiations that cannot be replicated in a virtual format.

COP26 had nearly 40,000 people registered for the conference: 21,967 representatives from parties and observer states; 14,033 observers; and 3,781 media (Earth Negotiations Bulletin 2021). For comparison, the American Geophysical Union's (AGU) Fall Meeting, the world's largest earth and space science conference, had 28,000 attendees in 2019. Klöwer et al. (2020) found that 75 percent of emissions from AGU 2019 were attributed to 36 percent of the participants who flew greater than 8,000 km to attend.

We suggest that COP choose locations that would minimize travel for as many participants as possible, prioritize public transportation, and implement a hybrid format that can increase accessibility and negotiation visibility to all participants.

ii. Carbon Footprint of Conference Food

In addition to conference transportation and travel, food choices also increase the carbon footprint across the supply chain. Poore and Nemecek

(2018) conducted a meta-analysis comparing different types of food production systems and found that animal-based foods are prone to have a higher emission footprint than plant-based foods. This study found that producing a kilogram of beef emits 60 kilograms of greenhouse gas emissions (GHGs) (CO₂eq.) while peas emit 1 kilogram of total GHG emissions per kilogram of peas (Poore and Nemecek 2018; Ritchie 2020). According to Lombrana and Shanker (2019), vegan options were scarce at COP25 which is counterintuitive for a climate conference. COP26 was the first COP to publish the carbon footprint of each meal on its menus but its vegan options were scarce and vegetarian options were limited. About 40% of the dishes were plant-based, about 60% were vegetarian, and no information is available on the vegan options (Adam and Westfall 2021; Levy 2021).

For most foods, land use manipulation and processes at the farm stage produce the most GHG emissions, which highlight the importance of opting for foods that are locally grown and easier to deliver. COP26's catering and hospitality partner, Levy UK + Ireland, states that its menus are low carbon and use mostly local and in-season produce. Ninety-five percent of the food was sourced in Britain and many suppliers were within 100 miles of Glasgow (Levy 2021).

Food packaging, food waste, and utensils also carry an environmental impact. Food waste alone contributes ~8% of global GHG emissions, which would make it the world's third largest emitter if represented as a country (Hawken 2017). This can be reduced, if not eliminated, with the implementation of composting (Ritchie 2021). Fieschi and Pretato (2018) showed that biodegradable and compostable single-use utensils had a lower environmental impact, and when combined with composting would be the best option for catering because of its smaller carbon footprint.

To reduce its carbon footprint, COP should make 100% of its conference food plant based, vegan and locally sourced when feasible. COP organizers should work with the host nation to ensure

efficient composting for conference-generated food waste and compostable items. As a climate conference, COP should set a precedent on its food choices and climate impacts.

III. Conference Scale Changes: Transitioning Towards Hybrid Conferences

In addition to conference travel and food selection, Section III examines how energy consumption, COP's side events, and attendee representation influences COP's carbon footprint. We discuss how changes to these conference scale factors can reduce emissions while advancing the climate agenda.

i. Energy Consumption

Convention centers consume an enormous amount of energy for lighting, multimedia devices, and air conditioning across a vast amount of space. Neugebauer et al. (2020) conducted a Life Cycle Assessment on a 3-day international academic conference and found that its carbon footprint was 455 tons of CO₂eq., or 0.57 tons CO₂eq. per participant. In perspective, a person living in Rwanda generates 0.67 tons CO₂eq. emissions per year (Neugebauer et al. 2020). This study showed that some of the largest contributors included but were not limited to electricity consumption, thermal energy consumption, water usage, and waste generation (Neugebauer et al. 2020). The venues chosen for COP26 emit about 6,659 tons of CO₂ per year, which is unjustifiable for a climate summit (McLaughlin 2021). Although virtual conferences are not a zero emitting option and final data on emissions are inconclusive, they reduce GHG emissions from in-person conferences substantially (O'Brien and Yazdani Aliabadi 2020). Ong, Moors, and Sivaraman (2014) highlight that conducting conferences virtually reduces carbon emissions by up to 90%. As a whole, virtual conferences produce only 7% of the energy of an in-person event (Ong, Moors, and Sivaraman 2014).

With virtual conferences, attendees are not traveling or occupying venues that have high electricity demands. Nevertheless, virtual conferences still have an environmental impact due to the energy needed to support network data

transfer use, server use, and computer use, to name a few, but its impact is smaller than an in-person conference (Faber 2021). When deciding how much of a conference can be made virtual, there are several challenges to consider. Those seeking an in-person option for COP may experience visa restrictions, trouble finding childcare, or lack of budget to travel and pay for travel-related expenses. When considering the virtual option, attendees may experience limited access to required technology, internet connectivity issues, or a knowledge gap in technological skill. Moreover, international attendees may experience unequal access to a conference's activities or a divided global scientific community, with one side more connected than the other. A hybrid conference's features may successfully address these barriers by, for example, allowing an attendee to participate virtually if they have visa restrictions or an attendee who lacks access to technological equipment.

ii. COP Side Events

COP hosts smaller events beyond the main negotiations known as side events (United Nations Climate Change, n.d.). These side events are open to official observers and include panels, roundtables, and exhibitions in the same venue as the negotiations. The number of side events have recently increased as more organizations and NGOs are becoming involved as observers, with approximately 300 occurring at COP25 (United Nations Climate Change, n.d.). Despite increasing the carbon footprint, side events bring together a diverse range of voices to discuss climate issues. As compared to official negotiations, side events focus on discussing climate solutions, debating strategies, and presenting the latest climate science. Approximately 60-70% of side events are directly related to the negotiations, with the remainder offering an opportunity to introduce new items, discuss strategies at varying levels of governance, or explore issues which are political or sensitive (Schroeder and Lovell 2012). Participants, particularly from Africa, G77, and less-developed countries find side events useful (Hjerpe and Linner 2010). To reduce emissions, COP should create side events as a virtual component, while negotiations remain in-person for party delegates.

Alternatively, establishing regional in-person meetups would limit travel emissions while still providing opportunities for networking in-person.

iii. Tackling on Inequalities with Virtual Conferences

Climate change effects vary significantly across social groups, such as income level, gender, education, and racial and ethnic profiles (Singer 2018). These inequalities will become more severe and understanding them is critical for future policymaking aimed at mitigating climate change. Women's representation in politics and reduced gender inequality has been shown to lead to better climate policies and lower carbon footprints (Andrijevic et al. 2020). By providing women with more education, it leads to a slower population growth due to a more proactive management of their reproductive health (Hawken 2017). In 2019, only two out of the 15 constituted bodies in UNFCCC had near gender balance (40% - 60%) (The Secretariat 2019). Hosting a hybrid COP would provide greater access to attendees who experience financial and logistic barriers to attending a fully in-person conference. The attendees that tend to experience in-person conference barriers include women, developing nations, or minority groups (Sarabipour 2020; Wu et al. 2021). By having greater representation from diverse backgrounds, addressing climate change would become more inclusive of strategies for those impacted by climate change the most severely.

IV. Conclusion

An emission-free conference is difficult to achieve without carbon offsetting. Planning committees can implement alternatives as discussed that reduce or eliminate carbon emissions. These alternatives are not an exhaustive list and emissions created by conference committee meetings before and after the event, as well as conference materials (*i.e.* brochures, handouts) that require resources to create and generate unnecessary waste were not discussed. However, the alternatives discussed would decrease emissions significantly.

Virtual conferences provide a lower carbon footprint alternative to international conferences,

but at a cost of diminishing the in-person collaboration that humans thrive on. Thus, using both a hybrid approach and different carbon neutral alternatives would reduce a conference's emissions substantially without comprising the networking opportunities. When discussing a carbon neutral conference, planning committees must acknowledge both a technical and social

approach to reducing emissions. Embodiment of the UNFCCC's commitment to limiting climate change should be a central focus of COP's structure, providing a model for other conferences and demonstrating firsthand the feasibility of this sustainable architecture.

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Climate Blue is the University of Michigan's student organization that educates and empowers its members and surrounding community about climate change science, its impacts, and climate policy (both domestic and international). It's 2020-2021 Research Task Force members are:

Natasha Dacic is a Ph.D. candidate in the Climate and Space Sciences and Engineering Department. Her research focuses on urban and agricultural greenhouse gas emissions.

Alexa B. White is a Ph.D. candidate in the Ecology and Evolutionary Biology Department. Her research focuses on how agroecology can resolve the future of world hunger as it relates to international climate policy, specifically UN Sustainable Development Goal 2.

Ranveer S. Ajimal is an undergraduate biochemistry research assistant in the Molecular, Cellular, and Developmental Biology department.

Katelyn M. Boisvert is a dual Masters student completing a M.S. from the School for Environment and Sustainability and a M.M. from the Ross School of Business.

Lunia E. Oriol is an undergraduate student in the Climate and Space Sciences and Engineering Department. Her research focuses on atmospheric modeling and atmosphere-biosphere interactions.

Sivah Akash graduated in 2021 with a M.S. from the School for Environment and Sustainability. His Master's project involved determining the transportation emissions baseline for a group of buildings in Ann Arbor, MI.

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