

COP28 PRIMER: How the Voluntary CO₂ Offset Market Threatens the Paris Agreement

For decades, an unregulated global market for carbon offsets has helped companies (and others) meet their voluntary CO₂ reduction targets—typically by paying a developing country to reduce emissions in their place. Companies buying offsets to cover all their emissions often say they’re “carbon neutral” or “net zero.” But **research on offsets shows “the large majority are not real or are over-credited or both,” as one expert noted in 2023.** That’s why most are so cheap, under \$5 a ton.

In the 2015 Paris Agreement, the world’s nations agreed to deep CO₂ cuts by steadily ratcheting down their emissions targets (Nationally Determined Contributions or NDCs) to avoid dangerous climate impacts. Article 6 of the Agreement lets nations help meet their NDCs with CO₂ offsets to be created in a U.N.-run regulated market. At Glasgow in 2021, the world agreed these “authorized” offsets must come with a “corresponding adjustment,” which ensures the seller can’t also claim the offset it sells (explained on next page). In 2023, [a World Bank analysis](#) found such offsets may cost **over \$100 a ton**—which is, not coincidentally, the cost of an emissions credit in the most credible regulated market today, the EU’s European Trading System.

A [2021 review article](#) warned that **“there is a risk that ... the voluntary carbon market undermines the objectives of the Paris Climate Agreement.”** This risk occurs when a country makes a cut in emissions it claims toward its Paris target (NDC) while also letting a company (or country) that helped fund the project claim the same tons in the voluntary market—so-called “double counting.”

The German Environment Agency [showed in 2020](#) that **“where there is a risk that the same emission reduction outcome could be claimed more than once, the impact of voluntary engagement in carbon markets could be negligible, or even lead to an overall negative climate impact.”**

This double counting/claiming “is problematic,” noted a [2022 article](#) “since it can displace or delay climate action. **A country may no longer implement emissions reductions they would have normally carried out if they can still count them after they’ve been sold to someone else (who also counts them).**” Countries will be in no hurry to spend their own money to reduce emissions to meet their NDCs if they can just wait long enough until some company pays them to make that reduction.

“When double counting displaces climate action, it undermines the core promise that a carbon credit must always unlock additional mitigation,” the 2022 article explains. **“This means that any offset claims based on double-counted credits are unreliable and inappropriate.”**

The voluntary market could ignore this problem since it’s not regulated and basically a pretend market anyway ([as I’ve documented](#)). But the literature has made clear since 2000 that a regulated offset market for complying with a global climate treaty *must* solve the double-counting problem.

Yet, the solution is a corresponding adjustment—which makes the offset much more expensive. So, while many, such as [the Gold Standard](#), a top certifier of carbon credits, believe that voluntary offsets must come with adjustments to be credible, others disagree. The 2021 review finds that **if it doesn’t embrace the corresponding adjustment, “the voluntary carbon market may become obsolete or worse, a threat to effective climate change mitigation.”**

UPenn PCSSM primers aim to quickly inform COP 28 decision-makers about problems with specific climate solutions.

Joseph Romm (Rommj@sas.upenn.edu) is the former acting assistant secretary of energy efficiency and renewable energy with a Ph.D. in physics from MIT. He’s a UPenn senior research fellow and author of the June report, [“Are carbon offsets unscalable, unjust, and unfixable—and a threat to the Paris Climate Agreement?”](#)

WHY AUTHORIZED OFFSETS (WITH CORRESPONDING ADJUSTMENTS) SHOULD BE \$100+/TON

What is the corresponding adjustment and how does it solve the double-counting problem?

Imagine the US and Brazil each emit 2 billion tons (Gt) of CO₂ a year and have both pledged to zero those out. Imagine the US funds projects in Brazil to cut their emissions 1 Gt/yr so we can offset half our emissions. After the cuts, Brazil now emits 1 Gt/yr. But if the US claims those tons as offsets then we will say our net emissions are also 1 Gt/yr. Thus, while these projects only cut global emissions 1 Gt, they're being counted as if they cut emissions 2 Gt. That would be fatal to Paris.

There are only two solutions. One, the buyer doesn't count the reductions. This is not an offset, and U.S. emissions would stay at 2 Gt/yr. The US is simply contributing to Brazil cutting its emissions to 1 Gt/yr. That will be called a "mitigation contribution emissions reduction."

Two, the seller doesn't count the reductions. That is an "authorized offset." It requires a bookkeeping change called a corresponding adjustment. The seller issues a guarantee it won't use the reductions to meet its own Paris targets, its NDC. In the example, the US can now claim its net emissions are 1 Gt/yr, but Brazil would have to adjust its emissions baseline by adding back the 1 Gt so it would officially still have 2 Gt/yr. The tons added back are the corresponding adjustment.

In short, **the buyer pretends the reductions occurred in its home country, while the seller must pretend their own emission reductions never occurred at all.** The implications are huge but poorly understood. **The buyer just made achieving their Paris climate commitment easier, while the seller just made achieving theirs harder.** This is not a great deal for the seller. Here's why.

Both the U.S. and Brazil pledged to go to zero. But officially, the U.S. now needs to cut emissions by only another 1 Gt/yr, which is half of its actual emissions, to get there. It can do that cheaply by making its easiest cuts first. But Brazil sold off its easiest cuts to us. Now, to go to zero officially, it must make its most expensive 1 Gt of reductions. It will have to buy another 1 Gt of offsets in the global market later. By then, the cheap reductions will be largely gone, and other developing countries will also be bidding for those tons—if they too let rich countries skim off their cheap emission reductions.

So, this is a bad deal for the seller—unless the price of these offsets is high enough to cover the cost of the tons it will need to buy. That was the point of [2023 World Bank report](#). How high could the cost be? Well, if the authorized offsets cost much less than the marginal cost for rich countries to cut their own emissions, they will simply buy a lot of those offsets, bidding up their price. As the Bank notes, that marginal cost is over \$100 a ton. But then if authorized offsets are so expensive, most developed countries will simply reduce their own emissions. And that's how things should be. Why?

WHY OFFSETS SERVE LITTLE PURPOSE IF THE GOAL IS ZERO GLOBAL EMISSIONS

Carbon offsets make little sense when everybody has to go to zero. **Selling off your easiest reductions cheaply to another country is self-defeating.** In theory, the world only has to go to "net zero" and could offset residual emissions with CO₂ removal strategies. But as I explain in two new reports, the most prominent and modeled removal strategies—[planting trees](#), [direct air capture](#), and [bioenergy with carbon capture and storage](#)—don't scale and the latter two would make things worse.

In short, developing countries should not sell their authorized offsets cheaply. And voluntary offsets need a corresponding adjustment so they don't undermine genuine climate action.