# BLOCKCHAIN SOLUTION TO CARBON-OFFSETS

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A blockchain solution to carbon reduction is a problem offering unique challenges, and is perhaps best examined in the history of existing carbon-offset schemes. Most carbon-offset programs fall into two categories. First, countries, companies, or sectors voluntarily propose that they can meet a self-appointed reduction (voluntary market). Second, a central authority forces them to meet a reduction benchmark (compliance market). In either, success is rewarded proportionally to the amount of reduction. With ease-of-implementation in mind, a compliance market is unlikely as entities would probabilistically not agree to a central authority imposing limits. Any successful carbon reduction system will likely be built upon a voluntary market. Voluntary non-blockchain reduction schemes have shown success in the past and can be used as a base model over which to bring in the efficiencies blockchain offers.

One of the most successful examples of voluntary reduction was seen with ozone depleting substances (ODS). Statements urging people to stop purchasing ODS-based products showed limited success as the free-market pressure to keep using ODS's was stronger. Significant reduction was achieved with the internationally ratified Montreal Protocol [1], which, despite being completely voluntary, worked well because it laid out a clear platform. Entities were not told to "stop using" ODS's, but were given a clear way to do so. This included support (monetary and otherwise) for ODS alternatives, fair reduction goals taking into account special provisions for developing countries, trust where an agreed-upon "overseer" evaluated adherence, and mutual cooperation [1]. With this in mind, carbon-offsets can be broken into two-tiers requiring different blockchain approaches: one tier addressing reduction at a national level with a similar scheme to the Montreal Protocol, and a second tier incentivizing individual reduction.

The first tier is simply an easy-to-use global blockchain carbon-credit ledger and trading platform. As 63% of global carbon pollution is put out by just 90 entities who are largely nationally/state managed [2], it makes sense to provide a separate tool for these "big-producer's" focusing on large-volume trading. Entities record in a distributed ledger how much they currently use and their reduction goals, updating at the end of the year with the verified values. A carbon-credit blockchain token tied to a globally traded marketplace provides:

- Information--What entities are the using the most carbon? Are they making honest efforts to reduce? What are realistic reduction standards?
- Traceability and Transparency--Who owns the credits? Has a credit been retired?
- Trust--Is anyone gaming the system? Lying about reductions? Manipulating the market?
- Price Stability--Lots of volume allows an accurate setting of price for carbon, reducing volatility and illiquidity.

Information, transparency, and convenience is the incentivizing force; it is a carbon-offset scheme but streamlined more than any other implementation of the model has been. Conditionally, money gained from the sale of credits to entities that did not meet their goals must be spent on carbon-reduction technologies or green initiatives. This creates a positive feedback loop where money is re-distributed to foster growth in alternative-energy sectors. Poorer entities who might suffer from carbon-reduction could be given "free" tokens to offset the problems of early carbon-reduction, allowing healthier economies to help subsidize growing ones.

The one piece that cannot be optimized by blockchain is the overseer or committee who sets fair reduction standards and verifies truth and compliance. Like the Montreal protocol, this will require experts as part of an assessment panel. However, having blockchain be the primary record of information makes these "overseer's" more effective. The immutable nature of the ledger means participating players are less likely to report false information or game the system, the need for verification from buyer and seller has less associated overhead, and there is no double-counting of given or retired credits. So, while the overseers are still imperfect, blockchain makes the accounting and updating of this entire process streamlined.

The second tier of carbon-offsets is to incentivize individual reduction. A few blockchain companies are already spearheading these efforts, accounting for the other 37% of global carbon pollution.

CarbonX rewards good eco-choices [3]. They intend to buy offsets tied to certifiable greenhouse gas reductions, then turn around and sell the credits to retailers. Retailers can then tie these credits to purchases in store. For example, if a consumer buys an eco-friendly dishwasher, they are rewarded with credits that can be used on discounts on others items in the CarbonX partnership family. Manufacturers are incentivized to do this for several reasons. Being green is trendy, they are designing a built-in blockchain loyalty system, and they receive data from tracking your purchases to better advertise services and products to the users.

A second company is Poseidon[4] were user choices are influenced by making them aware of the carbon contribution of every day products. If Amy buys shoes that cost 12g of carbon to manufacture, she is told this and the retailers point-of-sales system sends this data to the Poseidon backend which executes smart contracts to make her shoes carbon neutral [4]. Similar to how listed calorie counts on menus can influence people's food choices, Amy may choose to pick "greener" items. A combination of these two models is likely the sweet spot. CarbonX's model captures the retailers and manufactures pushing them to focus on production of greener items, and Poseidon gives consumers the information.

While no market can 100% be captured, this two tiered approach of addressing national and individual carbon consumption separately with blockchain as the bookkeeping backbone should encourage reduction at all levels.

## BIBLIOGRAPHY


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