

Carbon Credits

Definitions

Carbon Credits

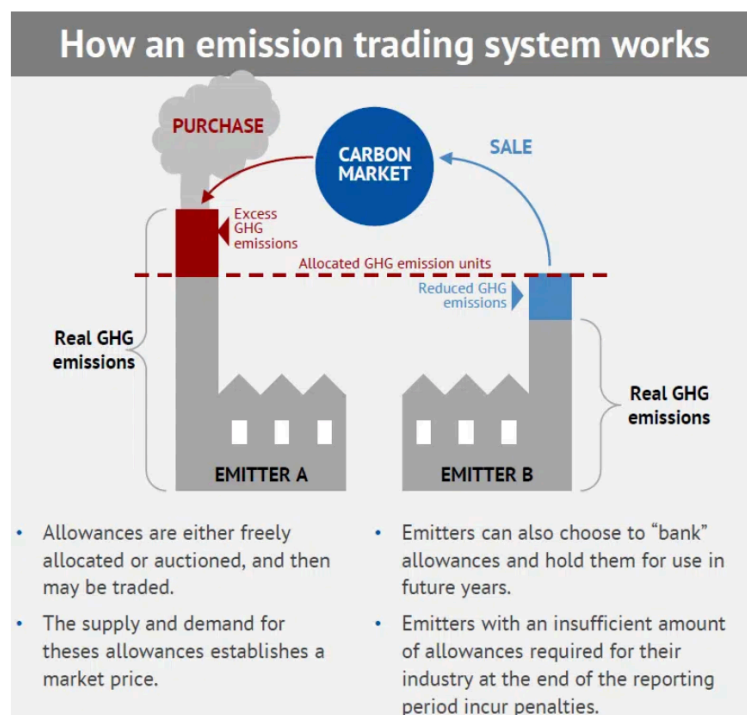
- issued by national or international governmental organisations
- traded in one tonne units
- frequently issues under a “cap and trade” program
 - regulators set a limit on emission i.e. a cap
 - that cap is reducing over time, making it harder for businesses
 - think of a credit as a “permission slip” to emit a carbon unit

Carbon Offsets

- earned by reducing the amount of carbon in the atmosphere e.g. by planting trees
- offsets form the basis of the Voluntary Carbon Market
- by buying offsets, companies can reduce their attributable carbon footprint

Carbon Markets

- **Regulated** - set by “cap-and-trade” regulations of governments
- **Voluntary** - where businesses and individuals buy credits to offset their credit emissions.



Key Points and Commentary

- the market for offsets is lacking standardisation and definition. it is not yet commoditised
- so far, it has been used as a corporate tool to neutralise emissions - as a tool to reduce corporate apparent gross emissions, but the validity of this mechanism is being questioned as it is more about shifting responsibility than actual reductions in carbon output by existing businesses
- the biggest influence on pricing today comes from hard-to-quantify factors like additionality, measurability and permanence.
- the market may experience wide swings in expected supply, with corresponding volatility of prices, depending upon what emerges on the qualification front and how widely the net is cast in the creation of offset credits
- a key area of criticism for the offset market today is that developers are still free to charge whatever they like for offsets, as there is no overarching body overseeing these transactions. So, it operates as a free market rather than a regulated market. You can decide for yourself what is preferable from a philosophical standpoint
- pricing in the offset market is more akin to a black box than a normal, functioning commodities market but ultimately the price is still set by supply and demand and consequential negotiation with the assistance of industry verification and registration .
- supply forecasts are clouded by what will be viewed as legitimate supply going forward with there being pressure to give accreditation to projects that remove carbon as opposed to avoiding the emission
- so far the offset market is not about reducing carbon levels. Rather, it is about shifting responsibility and window dressing. It is not about decarbonisation per se, so the offset market will continue to be vulnerable to criticism, in favour of more aggressive initiatives that actually have carbon removal as the aim, as opposed to avoidance of responsibility.
- new, cleaner technologies fall into the removal category e.g. graphene in cement (though here the word avoidance has a different connotation. You can avoid the creation of carbon emissions in the production process (as opposed to avoidance of responsibility).
- direct air capture (DAC) projects require a massive scale-up in capability and quantity but there are still doubts about its effectiveness
- offsets are a means to and end. They are a catalyst to changing behaviour so that the ultimate solution will be circumventing processes that emit carbon, to a lesser or greater extent.
- offset markets will still have a role going forward though, as a system where accountability for unavoidable externalities have an economic impact on emitters.

Summary

- the **carbon offset market** could grow 50-fold by 2050, with nearly two thirds (4.2 Gt CO₂e) of this supply coming from avoided deforestation (REDD+)
- the market could be worth \$190bn by 2030
- but, there are a number of possible scenarios to consider
- the market has been expanding for five years to date. Supply of offsets increased by 66% p.a. since 2018
- 86% of offsets since 2015, have come from nature-based solutions (287 million) and energy (284 million). This will soon change – registries are cracking down on energy offset issuance, saying they can only be issued in least-developed countries (LDC).
- Offset supply from clean cookstoves, another avoidance sector, could reach 542 Mt CO₂e by 2050
- but, supply is completely curtailed when solar and wind become the cheapest forms of energy generation in LDCs.
- An oversupply amounting to 3.5 Gt CO₂e will exist in 2030, keeping prices at just \$11/ton if supply continues to grow as described above
- but if offsets are limited to removal offsets rather than avoidance offsets e.g. REDD, clean cookstoves and clean energy, the market will be much tighter. The market becomes undersupplied in 2029 and prices could shoot up to \$224/ton (SBTI scenario). Science Based Targets Initiative (SBTI).

Carbon Offset Markets Today

- demand has mostly come from consumer-facing companies that want to reduce their carbon footprints
- they buy offsets as an alternative to actually reducing their carbon emissions. These offsets are retired (consumed) as companies reduce their apparent carbon emissions through book entries rather than physical reductions
- there are four major voluntary carbon offset registries that track all verified projects in the market: Verra (VCS), Gold Standard, American Carbon Registry (ACR) and the Climate Action Reserve (CAR).
- 46% of voluntary carbon offsets retired since 2015 have come from energy generation projects that issue offsets on the basis that the revenue earned from offset sales will reduce the costs of the projects, but seeing as these projects have started to become cost-competitive, the carbon offset registries, including Verra and Gold Standard, have changed their criteria to only include clean energy projects in least-developed countries (LDC).
- Nature-based solutions (NBS) are the second-most popular offset in terms of demand, making up 34% (157 million tonnes) of retirements since 2015. NBS applies to projects

that avoid deforestation (abbreviated as REDD+) or focus on reforestation and afforestation, but can also include agriculture, land management and water restoration (known as blue carbon). These projects make up a growing share of offset demand and are expected to become the leading offset sector as early as next year.

- The third-biggest sector for demand to date is emissions, with nearly 50 million offsets retired since 2015. Emissions projects today are mostly focused on landfill, gas destruction and flaring, as well as methane capture and combustion
- avoidance projects account for 86% of retirements
- the market is oversupplied today, with thousands of potential projects

Third Party Initiatives

- The Science Based Targets Initiative (SBTI) is the largest third-party initiative verifying emission reduction targets for companies. To date, over 2,000 companies have set or committed to set a science-based target (SBT), meaning they pledge to reduce their emissions on a Paris-aligned trajectory - by 50% by 2030 and at least 90% by 2050
- in the year a company aims to go net zero, these offsets must come from removal projects, rather than avoidance projects
- A carbon offset market operating under SBTI's methodology would see significant increases in prices, due to the huge swath of supply no longer permitted. This may force companies to invest more in reducing their own gross emissions, eliminating the need to offset as much as they can
- the Taskforce on Scaling Voluntary Carbon Markets (TSVCM) was created by the International Institute of Finance (IIF). The group aims to serve as a steward for the carbon offset market, primarily through the following mandates;
 - i. Create a set of core carbon principles (CCP), outlining key traits a high-quality carbon offset needs in order to be bought or sold on the market
 - ii. Outline eligibility principles for various suppliers and developers interested in entering the market
 - iii. Develop a core governance body to enforce CCPs and uphold integrity in the market
 - iv. Create benchmark contracts and promote the development of trading infrastructure like exchanges and forward curves to improve liquidity in the market
- consider also the Article 6 agreement that could have many potential impacts, ranging from a full merger with the voluntary market to a niche market for countries and high-quality projects

The Long-term Offset Outlook

- there is a great deal of uncertainty around the future demand, supply and price over the coming decades, though the offsets market will still play a massive role in future decarbonisation.

- While offset demand today can be attributed to the number of credits retired, most of the activity seen thus far is behavioural, rather than fundamental. This means companies buy offsets to satisfy a specific customer, achieve carbon neutrality in random years or generally try to distinguish the product they offer, rather than as a last-resort mechanism to meet a science-aligned emissions target
- Potential carbon offset supply has been modelled for five different sectors, making up 99% of supply in the offset market since 2015.
 - i. The largest of these is energy generation, which makes up 43% of the market over that time period, specifically from clean energy
 - ii. Reforestation (3%) and
 - iii. avoided deforestation (REDD+) (39%), which together encompass nature-based solutions, make up another 43% of supply.
 - iv. Emissions projects make up 8% of supply since 2015 – assume all future supply will come from direct air capture (DAC).
 - v. Finally, energy demand, specifically from clean cookstoves, makes up 5% of supply.

Price Outlook

- prices of offsets will be determined by the way the market is designed and how that design affects supply and demand
- factors like the exclusion of avoidance offsets and the scaling-up of technology-based removals could be the difference between a flourishing offsets market and one that is dead before it even gets started
- three scenarios are worth considering
 - i. voluntary market scenario - the way it operates now with minimal standards, but standards will begin to play a role and these could reduce supply
 - ii. SBTI scenario - only removal offsets are allowed
 - iii. hybrid scenario - allows gradual evolution of the market
- **demand and supply assumptions**
 - demand comes entirely from corporations who want offsets to cover residual emissions under their sustainability targets , or want to offer products such as green steel or carbon neutral LNG
 - offset demand will be behavioural based on a number of reasons
 - the offset market remains oversupplied out to 2050
 - expect demand will triple between 2030 and 2040, closing the gap between demand and supply. Reforestation will be a big factor
- low prices will offer little incentive to build projects or monetise offsets as a source of revenue. They will also lead to increased scrutiny of offsets, slowing the supply and a general recession in the markets.

- high prices will increase the incentive to speed up market forces and accelerate growth in the sector
- if the emphasis shifts to projects that remove carbon rather than avoiding it, supply of offsets will be significantly restrained. New technologies that replace dirtier technologies will play an important role.

In-depth Long Term Demand Outlook

- *“the biggest disruption to the carbon offset market will come from the surge in demand”*
- demand is coming from behavioural patterns rather than strict fundamentals
- residual emissions, once all other avenues for carbon reductions have been implemented, will stimulate demand for offsets
- countries are using offsets to meet their NDCs but these offsets aren't purchased from registries or through the market in the same way as a company would buy them

In-depth Long Term Supply Outlook

- the offset market is currently oversupplied
- many sectors are currently issuing just a fraction of their total potential supply, largely because project developers haven't yet seen a demand signal
- supply will depend heavily on what types of offsets are permitted by various initiatives, like SBTI. The exclusion of certain offsets could wipe away some potential supply
- due to the number of different potential sectors for offset supply, coupled with the uncertainties mentioned at the beginning of this section, there is a huge range of potential outcomes for offset supply
- moving forward, offset registries including Gold Standard and Verra will only allow supply from clean energy projects, namely solar and wind, from least developed countries (LDC). This will have significant ramifications for supply

Technology-based removal - Direct Air Capture (DAC)

- uses mechanical systems like fans and pumps to draw in air and pass it through chemical solutions or solid filters to remove CO₂. This CO₂ can then be recovered from the collection system and stored.
- DAC is more expensive than nearly any other type of offset and is expected to cost over \$200/ton in 2030
- Despite current prices of around \$600/ton, companies like Shopify and Stripe are already buying DAC offsets. Early-stage offtakers will be crucial to scaling the technology, which still needs to be demonstrated in large-scale plants. The largest DAC site currently operating is Climeworks and Carbfix's Orca plant in Iceland, which has an annual capture capacity of 4,000 tons of CO₂.

- DAC offset supply in 2050 could technically be tens of gigatons of CO₂, if companies are willing to pay

Phil Hardwick Podcast - COO of Base Carbon Corporation

<https://podcasts.apple.com/gb/podcast/smarter-markets/id1541404399?i=1000550136457>

- projects take time to prove credibility
- caveat emptor very relevant
- market is not fully commoditised yet
- consider geopolitical risks and different quality projects
- evolution will be in nature-based solutions - forests and grasslands - biochar - cement innovations
- carbon trading is about a catalyst for a better, sustainable society
- calculating future demand is a very difficult business
- see the issue is not about climate change, but rather, our existence on the planet.