



STATE OF THE TECH: CARBON CAPTURE & STORAGE



A STRATEGY BEYOND LOWERING EMISSIONS

The Paris Climate Agreement of 2015 calls for the Earth's temperature to increase by no more than 2°C over pre-industrial levels, but temperatures are already 1°C above the pre-industrial level and continue to climb; driven for the most part by CO₂ emissions of 42 billion tonnes a year (in 2019). In order to achieve the goal through cuts to

emissions alone, large emitting nations (China, 29%; US, 14%; EU, 10% - X% of Worldwide CO₂ Emissions, 2017) would have to cut far more than they're currently committing to. For this reason, carbon capture and storage (CCS) technology is an essential part of the strategy.



HOW MUCH DO WE NEED TO CAPTURE?

Studies by the National Academy of Sciences found that we'll need to be removing about 10 billion tonnes of CO₂ a year by 2050 and 20 billion by 2100 if

the Paris goals are going to be reached. For perspective, CCS technology worldwide captured 40 million tonnes of CO₂ in 2020, or 0.2% of 20 billion target.



EXISTING TECHNOLOGIES

From direct air capture (DAC) devices that capture carbon directly from the air, to point capture devices that absorb emissions at their source, there are many technologies already available for carbon capture and storage. When emissions come directly out of a coal plant, they're highly concentrated

(~10% CO₂), but once they're in the atmosphere they disperse widely. For that reason, DAC is a much bigger technical challenge than point capture. Pick one molecule at random out of the atmosphere and the odds that it will be CO₂ are just 1 in 2,500 (0.04% CO₂).



FUNDING AND TAX CREDITS

In 2008 the US enacted a tax credit, Section 45Q, that rewards the first 75m tonnes of CO₂ sequestered through CCS technology. Unfortunately, not knowing from the outset whether a given project would end up capturing the lucrative 74th-millionth tonne or the worthless 76th-millionth tonne tempered investor enthusiasm.

In 2018 & 2020, 45Q was amended. Instead of a 75m tonne cap, there is now a time limit creating a flurry of activity: all CCS projects that have started construction before December 31st, 2025 will be eligible for 12 years of tax credits. In 2020, the US again lead the globe, hosting 12 of the 17 new CCS projects around the world.

