Volumetric Injection Payments for Carbon Sequestration

Analogous to a Volumetric Production Payment (VPP) for future oil and gas production. . .A Volumetric Injection Payment ("VIP") **pre-purchases high-quality, geologic carbon sequestration volumes from unbuilt carbon capture and sequestration (CCS) projects.** The combination of cash and tax credits creates an actionable price now to provoke construction and to facilitate private finance. Investors can later resell some or all credits on voluntary carbon markets for a profit, and donations to a sibling entity earn tax deductions today.

IEA has concluded that "[r]eaching net zero will be virtually impossible without CCUS." More to the point, they write that "*Without a sharp acceleration in CCUS innovation and deployment over the next few years, meeting net-zero emissions targets will be all but impossible*." (IEA 2020) The Global CCS Institute echoes the urgency, *"[T]he steps taken between now and 2030 will determine whether CCS technology will be deployed at the scale necessary to meet the climate challenge.*" (Global CCS Institute, 2021)

GCCSI continues that this essential route is only possible through private, project finance and that the number one risk to private financing is the uncertain revenue from emissions credits. (*ibid.*)

Making it happen in Houston

All the necessary components for a successful geologic CCS industry concentrate in the U.S. and particularly in *Texas and the Gulf Coast:* many large-scale point-sources sources, rights of way for transportation, well-defined geologic pore space, and (critically) the skills and personnel of the oil and gas industry able to accomplish it all. An initiative for a major CO2 supply hub near Houston has already taken root. (NPC 2019, GCCSI 2021)

At the other end of the value chain, far more *companies and countries have committed to net zero* emissions than have a practical route to consummate the commitment. Corporate commitments are exploding, and 72% of global emissions are now covered by net zero NDCs. But projects still need *concrete, paying customers*. The VIP aims to bridge this gap by concentrating demand for carbon offsets – from consumers, companies and investors – into meaningful purchasing power.

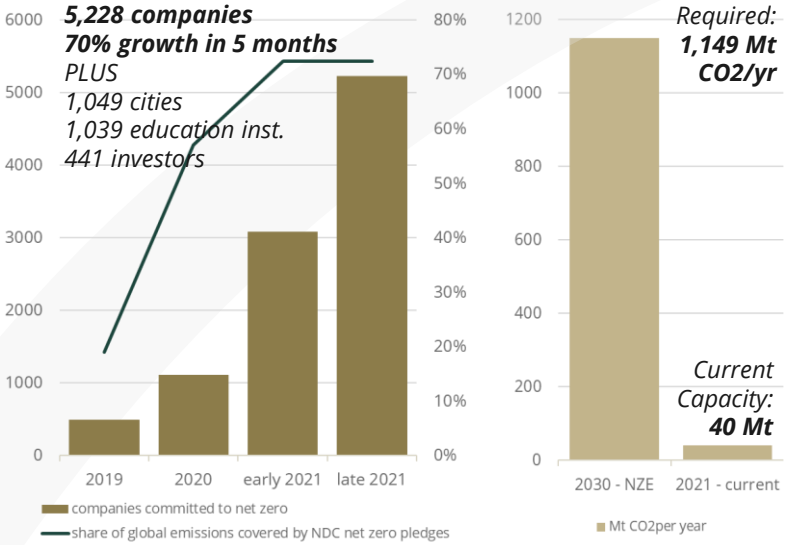
An emerging, growing but undersupplied commodity

The market for carbon offsets is likely to grow my many multiples, and carbon prices may easily multiply. Not unlike the start of trading in gold and oil in the 1970s, interest in the commodity has outpaced supply. More importantly, the long-term outlook for demand only continues to grow even as development has faltered.

CCS has lagged up to this point because the cost of capture has stubbornly exceeded the price in limited markets, but the price of carbon is very likely to increase in the future – by both policy and market actions. To meet emissions objectives, the long-term upper limit on carbon price will be set by the cost of scalable direct air capture. In the shorter term, the cost of carbon offsets will be set by increasing tax incentives and by increasing demand facing limited supply, as demonstrated by the rise in prices in 2021.

On the other hand, CCS projects have historically overrun budgets and underperformed capture. (Projects have also provided many lessons per Loria and Bright, 2021.) Carbon is just emerging as a *marketable commodity*, and future sale price of injection certificates remains highly uncertain.

Demand growth, lagging supply



(IEA, UNFCC Race to Zero, BP Statistical Review 2021)

Consumers also ready to buy

In the previous year, ***28% of consumers have not bought products*** *based on its maker's opposition to addressing global warming. 41% intend to avoid such companies in the next year.*

38% of consumers are "extremely" to "moderately" likely to switch banks or credit cards *if they knew their vendor was investing in fossil fuels.*

In the previous year, ***33% of consumers have bought products based*** *on its maker's steps to reduce global warming. (Yale, 2021)*

"Over 93% of respondents report that they are willing to pay a non-zero amount for carbon neutral fuel." *(UH Energy 2021)*

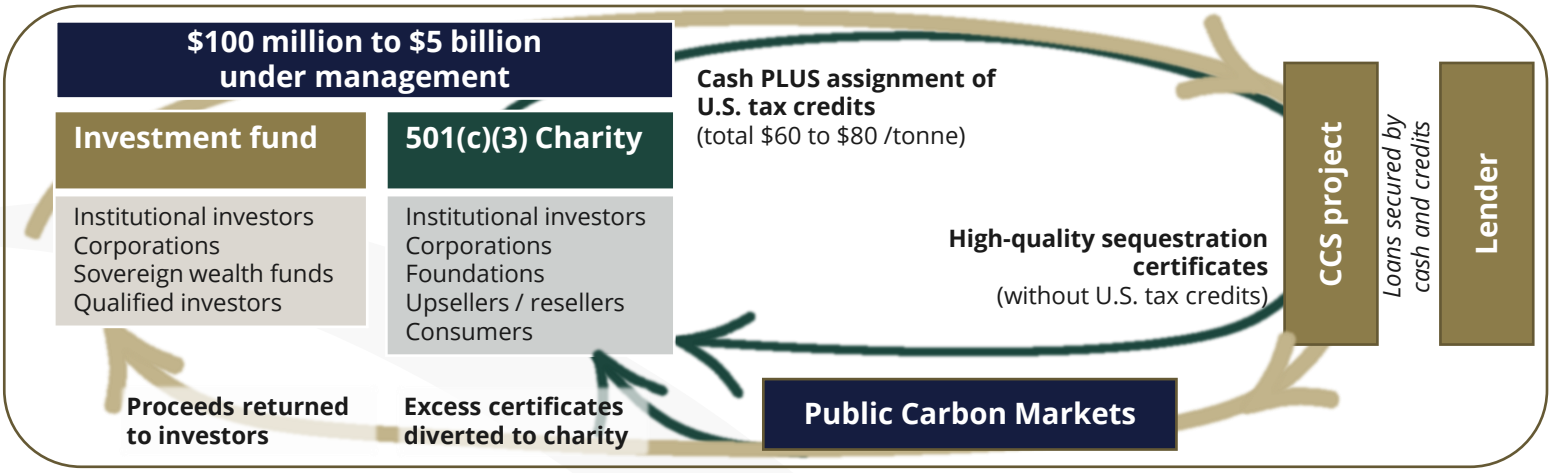
Charity can tap this demand by offering neutrality directly to consumers and through upsellers/resellers such as credit card companies, gas stations and oil change retailers.

Cost and Prices (USD/tonne)

Capture costs (only)				Value	
Direct Air Capture	134	to	342	180	45Q tax credit (2021)
Iron & steel	40	to	100		**range recommended by int'l NGOs**
Power generation	50	to	100		
Cement	60	to	120		
				35 to 50	45Q tax credits (2018)
Bioethanol	25	to	35		
NG processing	15	to	25	15 to 25	current broker price
				5 to 20	historical ETS prices
				1 to 32	most taxes & markets

Scaling across the country and globe

Development in Texas can easily transfer across the U.S.: world's second largest emitter, *low political risk* and similar synergies of supply and storage. What is more, *Article 6 of the Paris Accord* and the blue-ribbon *Integrity Council for Voluntary Carbon Markets* both now offer the prospect for *U.S. projects to sequester carbon on behalf of emitters and buyers anywhere in the world.* Ultimately, the optimized technology can be exported around the world by the same industry that globalized horizontal drilling and deepwater exploration.



How it works

The program operates in this new commodity market through two sibling vehicles – a commercial fund and a charity – run by the same management under the same modest, fixed administrative fee. The twin entities combine purchasing power and negotiate together for the same purchase terms from proposed CCS projects, offering cash (on the order of $10 to $30 /tonne payable upon full financing of the project) and *magnified by the assignment of associated U.S. tax credits of $50/tonne.* In exchange, the seller contracts to *deliver independently-verified injection volumes on a pre-determined schedule*. If seller fails to sequester enough volume, then it can buy and transfer credits from the open market, or the buyer may elect to take the volumes in subsequent years with an "interest" payment of additional volumes.

When independently-validated certificates are delivered, the charity retires its credits. Investors have the option to hold them, to donate them to the charity for a market-value tax deduction, or to resell the certificates into global cap-and-trade markets. Buyers of the credits may turn around and donate them to the same established charity.

Levered impact

Like corporations and consumers, investors may want to *donate directly to the charity to offset their own emissions and/or the emissions of their portfolio.* Institutional investors may also recommend the charity to their portfolio companies and may open doors to companies which can resell directly to consumers. Of course, nearly 100% of donated funds raised on the back of institutional relationships, *rewarded with tax deductions,* and *levered by federal tax credits* translate directly to stored carbon.

Larger funds as riskier investments normally require commensurate market returns, and investors may indeed require those returns and still welcome the less direct social benefits: *kick starting projects, seeding an industry, and helping create a market* for others to store carbon. These investors may in the end elect to donate excess returns to the charity for retirement rather than resale.

Investors may also pledge from the beginning to *donate excess returns* to the charity. For invested funds, the following table summarizes the percentage converted to stored carbon dioxide assuming combinations of ceiling returns, time frames, and sales prices (and including fees of 6% as discussed at right).

Purchase @ $20		Sell @ $35	$50	$80	$100	$150
8% ROR	3 yrs	23%	46%	67%	73%	82%
	7 yrs	8%	35%	60%	68%	78%
15% ROR	3 yrs	-4%	27%	54%	64%	76%
	7 yrs	-62%	-13%	29%	43%	62%

Expert process, low fees and market returns

Management will use its *expertise and relationships* within the oil and gas industry to source private placements via producers, lenders, and/or carbon brokers. Management will provide both *investment and technical due diligence*, and all projects must be validated by American Carbon Registry and monitored per EPA standards. Management will focus on projects with conventional financing and pursue synergies with lenders.

Management collects a *low fixed fee of 2.5% from funds donated* or invested and endeavors to place the funds within 12 months. Donors pay no additional costs, but investors pay additional fees to cover the cost of monitoring and managing the sale of certificates, namely a *small fee each anniversary (0.4%) plus* a *small percentage of the disposed value (1.5%)*.

Certificates will be delivered early in the life of the project, between five and 10 years from the date of investment, but certificates may be sold earlier through brokers or into an eventual public market.

Exceptionally clear metrics

The biggest success can be measured directly as carbon dioxide passes through a flowmeter at a wellhead on its way to its permanent new home in Cenozoic formations thousands of feet below the surface.

Decades-long projects will be built because the guaranteed purchase – cash plus tax credits – provides a viable price and enables conventional finance. The learning and the markets resulting from the first projects can snowball with global benefit.

Further Reading

IEA 2021, *Net Zero by 2050: A Roadmap for the Global Energy Sector*
IEA 2020, *Special Report on Carbon Capture Utilisation and Storage CCUS in Clean Energy Transitions*
Global CCS Institute 2021, *Unlocking Private Finance to Support CCS Investments*
National Petroleum Council 2019, *Meeting the Dual Challenge: A roadmap to at-scale deployment of Carbon Capture, Use, and Storage*
Global CCS Institute 2021, *CCS Networks in the Circular Carbon Economy: Linking Emissions Sources to Geologic Storage Sinks*
Loria and Bright (of Global CCS Institute) 2021, *Lessons captured from 50 years of CCS projects*
World Bank 2021, *State and Trends of Carbon Pricing 2021*
World Bank 2019, *Report of the High-level Commission on Carbon Pricing and Competitiveness*
Yale Program on Climate Communication 2021, *Consumer Activism on Global Warming, September 2021*
UH Energy 2020, *Carbon Management: Changing Attitutdes and an Opportunity for Action*