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Research Prepared in January 2023

Market Research

Demand on Climatech Solutions

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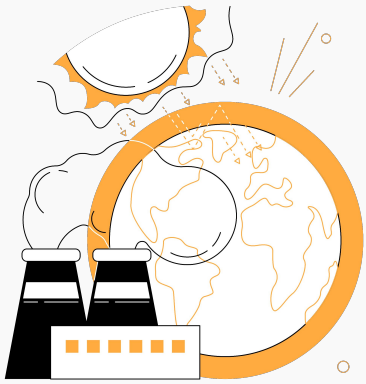

Research Limitations

Research is limited to explore market demand for the Climatech Solutions [i.e., NFT Trading platform for the VOC Credits] and Similar Tech Solutions and Products in US and EU.

Summary of Research

According to the world bank data US and EU together account for 22% (out of total 34.3 gigatonnes CO2 emissions footprint) of Global CO_2 emissions Footprint.

Environmental scanning proved climate change is goal for all of the countries signed The Paris Agreement. The most influential member countries and organizations such as multilateral development banks and climate funds announced significant financial support of USD 150-200 bln to the goals of climate change. One of the most important goal has been to achieve long-term low greenhouse gas emission.

Experts at the UN Climate Change Conference in Bonn have said that a new technology called "Blockchain" could play a major role in tackling climate change. It could contribute to greater stakeholder involvement, transparency and engagement and help bring trust and further innovative solutions.

There are already multiple tech solutions and products on the market which established innovative ecosystem supporting enhanced trade infrastructure through transparency and with accounting and verification using Blockchain and Web3 Technologies. These 6 exemplary tech solutions are good examples of high integrity market requirement towards the future growth outlook:

1. **THE BITMO PLATFORM**: The Platform enables issuance and exchange of "Blockchain Internationally Transferred Mitigation Outcomes" (BITMOs) as ERC-1155 Non-Fungible Tokens (NFTs) on the Ethereum blockchain. Each token, equivalent to one ton of CO_2 equivalent has all pertinent carbon credit data embedded right into the NFT.
2. **TERRAPASS, OR COOL EFFECT** - the retail market for voluntary carbon credits – allow access, but not holding or trading, which is the important distinction.
3. **MINTCARBON** - trading platform for carbon offset credits to accelerate the flow of capital to environmentally friendly projects. Platform allows minting carbon credits into NFTs, it tracks carbon credit NFTs and compares them to several other projects.
4. **PACHAMA** - Harnessing remote sensing and AI to capture carbon and protect forests. A technology company with the mission of restoring nature to solve climate change. This company is scaling verification, monitoring, and exchange of nature-based carbon credits, helping enterprises achieve Net Zero targets. The company platform allows users to purchase carbon credits for their organization on the Pachama marketplace.
5. **CARBON TRADEXCHANGE** - The Leading Global Spot Trading Platform for Voluntary Carbon Credits. The world's first digital carbon offsetting exchange for spot price, voluntary carbon credit trading.
6. **PERSEFONI** - a Climate Management & Accounting Platform (CMAP). The company's Software-as-a Service solutions enable enterprises and financial institutions to meet stakeholder and regulatory climate disclosure requirements with the highest degrees of trust, transparency, and ease.

According to the Climate Trade Report, the value of the voluntary carbon market (VCM) has quadrupled since 2020, reaching almost US$2B in 2021. Growth has been driven by both higher prices and stronger demand for carbon credits.

UK Carbon Markets Forum and Taskforce Outlook says the VOC Credits market must increase at least 15-20- fold and reach USD 50 bln in 2030. It is forecasted market to reach 100-fold by 2050 compared to 2019 figures.

Considering all important macro-environmental and market-specific information we must assume VOC credits market size to increase rapidly. International organizations like UN, EU and the most important Paris Agreement strongly support the creation of technology-based solutions including web3 technologies to effectively fix the issue of climate change through the reduction of carbon dioxide emissions.

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Carbon Dioxide (CO2) Footprint

A carbon footprint is a total amount of carbon dioxide and other GHGs the activities of a person or organization generate. It includes both direct and indirect emissions:

A direct emission originates from a source the reporting entity owns. Indirect emissions result from the reporting entity's activities but originate from sources the reporting entity does not own. (Lutkevich, 2021).

According to the world bank report CO2 footprint, it accounts for 34.3 gigatonnes (World Bank, 2020). This data changed since 2019 and was 36.3 gigatonnes in 2021 (International Energy Agency, 2022).

US and EU account for 22% of total CO2 emissions. 14% comes from US and 8% from EU.

Country/Region	1990	2000	2010	2015	2016	2017	2018	2019
US	4.9	5.8	5.4	5.0	4.9	4.8	5.0	4.8
EU	3.6	3.4	3.2	2.9	2.9	2.9	2.9	2.7
Other Regions	12.2	14.3	22.4	25.1	25.2	25.8	26.5	26.8
World	20.6	23.4	31.0	33.0	33.0	33.5	34.3	34.3

NOTE: World bank data on CO2 emissions in gigatonnes (World Bank, 2020).

Global CO2 emissions increase by 67% since 1990 [CAGR of 1.7%]. The Most [52%] CO2 emission comes from following regions/countries (World Bank, 2020):

1. China [31%],
2. India [7%],
3. Arab World [5%],
4. Russia [5%]
5. Japan [3%]

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Connecting Climate Change and Technology

The Paris Agreement

The Paris Agreement on climate change was adopted by 196 Parties on 12 December 2015 and entered into force on 4 November 2016. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels. This binding agreement brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects.

By 2020, countries submitted their plans [**long-term low greenhouse gas emission** development strategies (LT-LEDS)] for climate action known as nationally determined contributions (NDCs). In their NDCs, countries communicated actions they will take **to reduce their Greenhouse Gas emissions** to reach the goals of the Paris Agreement. Countries also communicate in the NDCs actions they will take to build resilience to adapt to the impacts of rising temperatures (United Nations Climate Change [UNFCCC], 2020).

Total funding announcement at COP 21 UN climate change conference accounted for USD 150-200 bln funds over 5-10 years horizon (United Nations Climate Change).

Putting the Paris Agreement on the Blockchain

Connecting the National Carbon Accounts of the world to enable cross-border collaboration in emissions reductions. Today's world presents nearly unlimited opportunities to reduce greenhouse gas emissions but **has lacked a system to connect emissions reductions opportunity with capital and demand.** Blockchain technology holds the promise of manifesting a transparent, public, and universal ledger, that can serve as a medium of exchange for emissions reduction outcomes (Pallant, 2021).

Examples of some of the already created solutions and announced initiatives are:

1. THE BITMO PLATFORM: The Platform enables the issuance and exchange of "Blockchain Internationally Transferred Mitigation Outcomes" (BITMOs) as ERC-1155 Non-Fungible Tokens (NFTs) on the Ethereum blockchain. **Each token, equivalent to one ton of CO2 equivalent has all pertinent carbon credit data embedded right into the NFT.** The BITMO Platform, built on Ethereum, links opportunities to reduce emissions with capital and demand, creating the future we need, faster (Pallant, 2021).

2. TERRAPASS, OR COOL EFFECT - the retail market for voluntary carbon credits allow access, but not holding or trading, which is the important distinction.

3. MINTCARBON - trading platform for carbon offset credits to accelerate the flow of capital to environmentally friendly projects. The platform allows minting carbon credits into NFTs, it tracks carbon credit NFTs and compares them to several other projects (mintcarbon, 2022).

4. PACHAMA - Harnessing remote sensing and AI to capture carbon and protect forests. A technology company with the mission of restoring nature to solve climate change. This company is scaling verification, monitoring, and exchange of nature-based carbon credits, helping enterprises achieve Net Zero targets. The company platform allows users to purchase carbon credits for their organization on the Pachama marketplace (Organizations, 2022).

5. CARBON TRADEXCHANGE - The Leading Global Spot Trading Platform for Voluntary Carbon Credits. The world's first digital carbon offsetting exchange for spot price, voluntary carbon credit trading (Carbon TradeXchange, 2022).

6. PERSEFONI - a Climate Management & Accounting Platform (CMAP). The company's Software-as-a Service solutions enable enterprises and financial institutions to meet stakeholder and regulatory climate disclosure requirements with the highest degrees of trust, transparency, and ease (Persefoni , 2022).

These 6 exemplary tech solutions are good examples of high integrity market requirement for the future growth outlook.

Voluntary carbon offsetting is also of interest to companies like Amazon and Microsoft and Nike who are no longer interested in waiting around for governments to take the lead and have set out to neutralize their current carbon footprint, or even their entire historical footprint, by their initiative (Pallant, 2021).

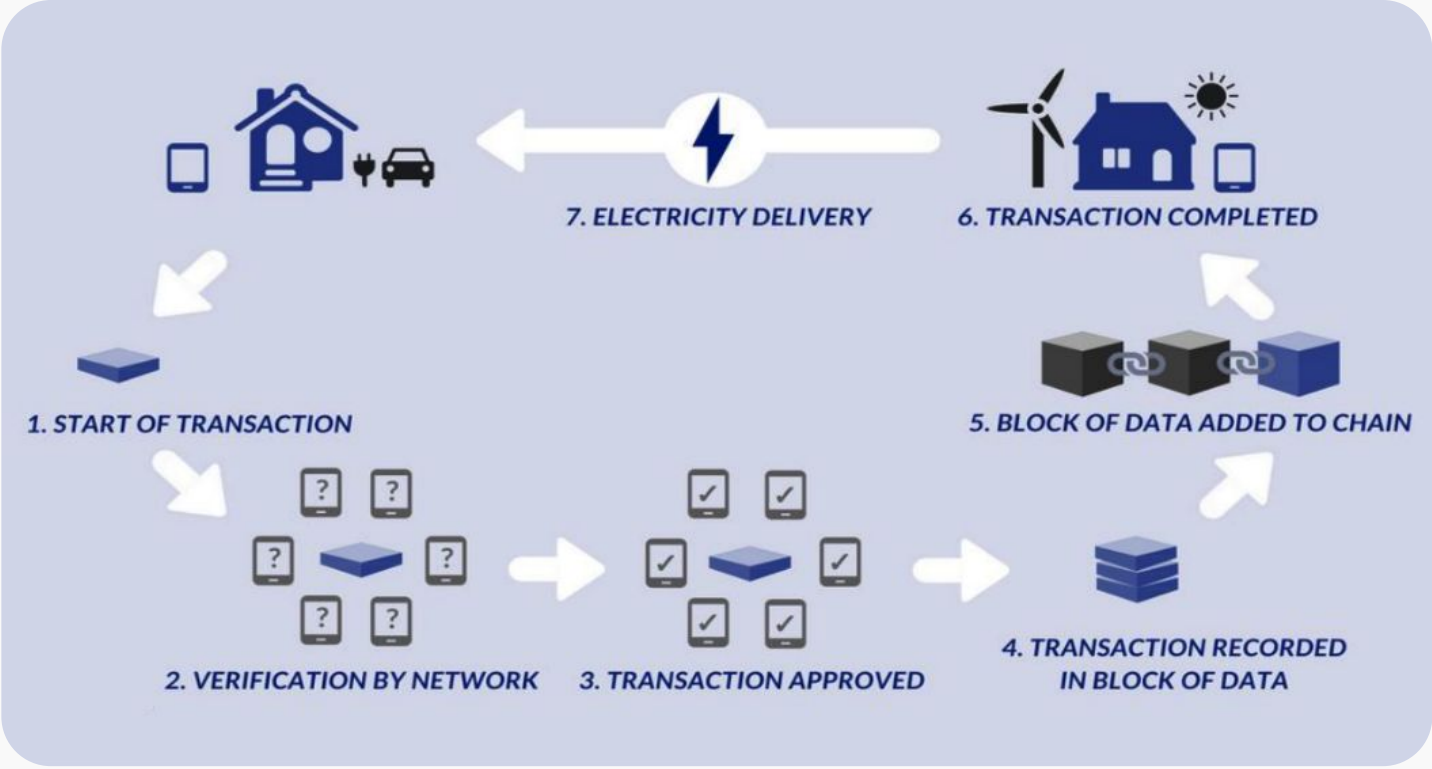
Meanwhile, demand for carbon credits is set to outstrip supply by a factor of at least four to one, according to the World Bank, and changed political climate in the U.S. with President Joe Biden which announced a climate administration (Pallant, 2021).

Blockchain Technology Boosting Climate Action

Experts at the recent UN Climate Change Conference in Bonn have said that a new technology called "Blockchain" could play a major role in tackling climate change.

Blockchain could contribute to greater stakeholder involvement, transparency, and engagement and help bring trust and further innovative solutions in the fight against climate change, leading to enhanced climate actions," said Alexandre Gellert Paris, Associate Programme Officer at the UNFCCC (United Nations Climate Change, 2017).

Blockchain technology can be used to develop peer-to-peer trade of clean energy, for certified and facilitated transactions among consumers (United Nations Climate Change, 2017).



For climate action, Blockchain technology could be used in the following specific ways (United Nations Climate Change, 2017):

Improved carbon emission trading	Facilitated clean energy trading	Enhanced Climate finance flows	Better tracking and reporting of greenhouse gas (GHG) emissions reduction and avoidance of double counting
Blockchain could be used to improve the system of carbon asset transactions. For example, IBM and Energy Blockchain Lab are currently working together to develop a Blockchain platform for trading carbon assets in China. Recording carbon assets on a public Blockchain would also guarantee transparency and ensure that transactions are valid and settled automatically.	The technology could also allow for the development of platforms for peer-to peer renewable energy trade. Consumers would be able to buy, sell or exchange renewable energy with each other, using tokens or tradable digital assets representing a certain quantity of energy production.	Blockchain technology could help develop crowdfunding and peer-to-peer financial transaction s in support of climate action while ensuring that financing is allocated to projects in a transparent way.	The technology could provide more transparency regarding GHG emissions and make it easier to track and report emission reductions, thereby addressing possible double counting issues. It could serve as a tool to monitor the progress made in implementing the Nationally Determined Contributions, or “NDCs” under the Paris Agreement, as well as in company targets.

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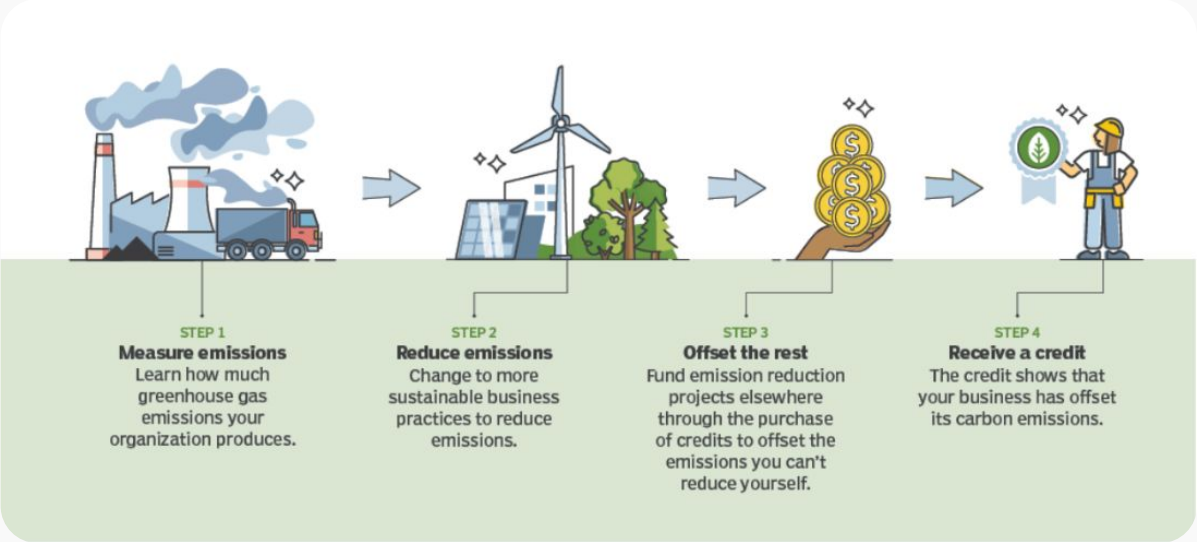
Offset Carbon Dioxide (CO2) Emission

An organization can take the following three steps to offset its carbon emissions: Calculate and measure emissions [1], Reduce emissions where possible [2], Offset remaining emissions [3] and Receive a credit [4].



Offsetting has some value in stopping climate change, but it is only one of many climate solutions necessary to save the climate. In offsetting, the carbon emission still takes place, but someone else offsets it. Reducing, eliminating, and reversing GHG emissions is a more effective approach to reducing emissions.

Offsets do not encourage polluters to stop producing GHGs; they encourage them to fund other entities to do so. Still, offsets do encourage improved carbon policies and implementation of them where there previously were none.

Carbon offsets will not solve climate change unless leading carbon emissions producers commit to carbon neutrality. This requires developing a sustainable supply chain and a commitment to using renewable and clean energy sources (Lutkevich, 2021).

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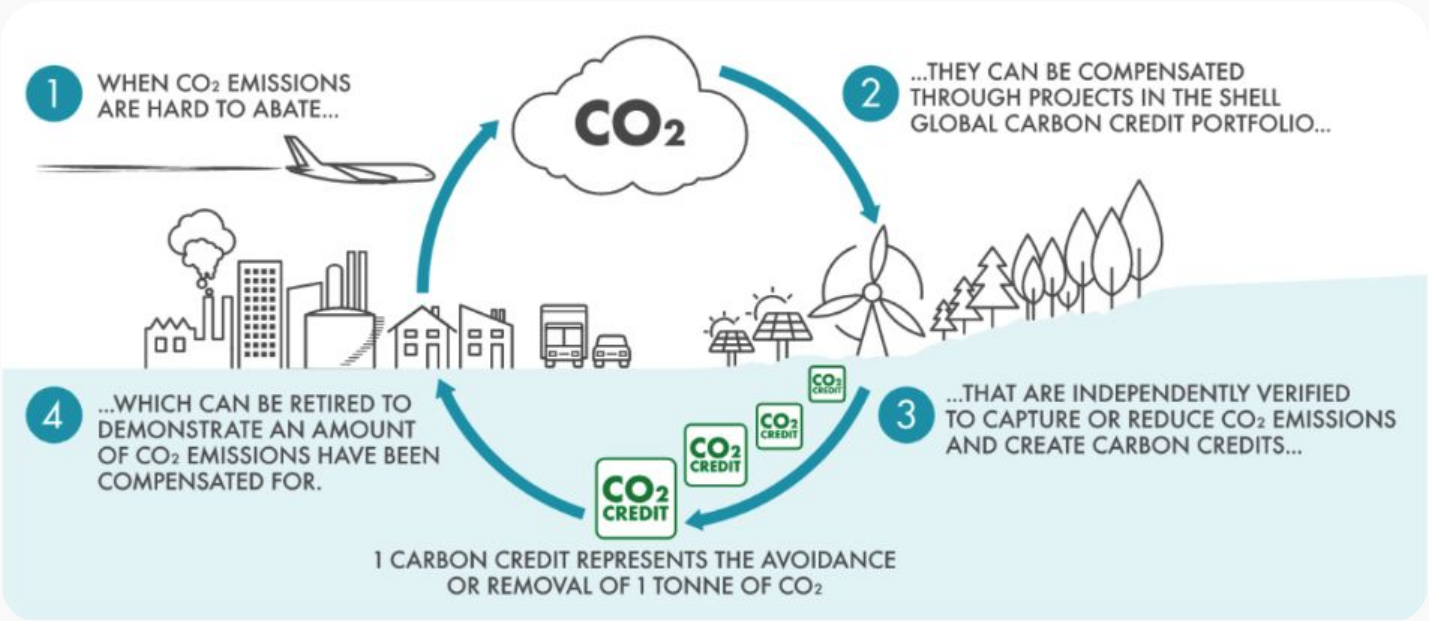
VOC Credits' Market

Example of Shell Decarbonizing

Voluntary carbon credits are a recognized mechanism that allows individuals and companies to invest in environmental projects that contribute to reducing the amount of CO_2 in the atmosphere.

Some offer broader value to society, including improved social livelihoods and biodiversity, and clean water and air quality while balancing peoples' carbon footprints (Shell Corporation, 2022).



The value of the voluntary carbon market (VCM) has quadrupled since 2020, reaching almost US$2B in 2021, according to a new report. The latest State of the VCM Briefing by the non-profit Ecosystem Marketplace reveals that the market has already topped the US$2BN mark in 2022.

Growth has been driven by both higher prices and stronger demand for carbon credits, with nearly 500 million credits traded in 2021, at an average price of US$4 per ton – up 60% year on year (Climate Trade, 2022).

Marketplace for Carbon Credits vs 2030 Requirements

By 2030, market demand is estimated to be 1.5-2 GtCO2e (~20X times higher than in the 2020-year indicator). A recent WEF report estimates that 0.2 GtCO2e is already committed to using by 700 of the world's largest corporates today.

Today, high-quality carbon credits are scarce because accounting and verification methods are still maturing, and the co-benefits are seldom well defined (UK Carbon Marekts Forum [Contributors - BCG, KPMG, Oliver Wyman]).

High integrity market will require:

1. A commitment to governance, corporate integrity, and an agile regulatory regime

2. Access to a highly qualified talent pool to tackle complex issues, e.g., accounting and verification

3. Centered on a global hub to bring together geographically diverse buyers and sellers

4. Access to a deep pool of global capital and key demand drivers to motivate investment

5. Innovative ecosystem supporting accounting and verification via new technology solutions

6. Enhanced Trade and post-trade infrastructure to ensure transparency and market efficiency

The Taskforce on Scaling Voluntary Carbon Markets (TSVCM), sponsored by the Institute of International Finance (IIF) with knowledge support from McKinsey, estimates that demand for carbon credits could increase by a factor of 15 or more by 2030 and by a factor of up to 100 by 2050. Overall, the market for carbon credits could be worth upward of USD 50 billion in 2030 (Mckinsey, 2021).

Scaling Voluntary Carbon Markets

A Blueprint for Effective Voluntary Carbon Markets. As the decarbonization of the global economy accelerates in the coming years, demand for carbon credits will likely increase. Key Figures Illustrating the Need to Scale (Taskforce, 2021):

1. In order Paris Agreement's long-term goals to be achieved and reach the 1.5-degree Celsius goal, the world must remain within a 570 gigaton (Gt) CO2 cumulative 2018–50 carbon budget.

2. This goal requires net GHG emissions to fall by 23 Gt by 2030 (which represents a reduction in emissions equivalent to 1.5 times the total emissions from all oil consumption in 2019).

3. To reach the net 23 Gt reduction by 2030, 2 Gt will likely need to come from sequestration and removal. In theory, there is sufficient supply potential to match this need, with approximately 3.0 Gt from nature-based sequestration such as reforestation and 1.0-3.5 Gt from technology-based removals such as bioenergy with carbon capture and storage (BECCS) and direct air capture with carbon capture and storage (DACCS). However, this supply potential is subject to significant mobilization challenges.

4. Achieving 2 Gt of emissions sequestration and removal by 2030 requires a 15-fold scale-up of voluntary offsetting in 2030 versus 2019, assuming carbon credits are used to finance all these actions. This will involve a significant step up in corporate commitments, which are sized at just 0.2 Gt in 2030 based on evidence today.

5. As carbon credits can help finance both avoidance/reduction measures as well as removal sequestration, the scale-up will likely be significantly larger than 15-fold

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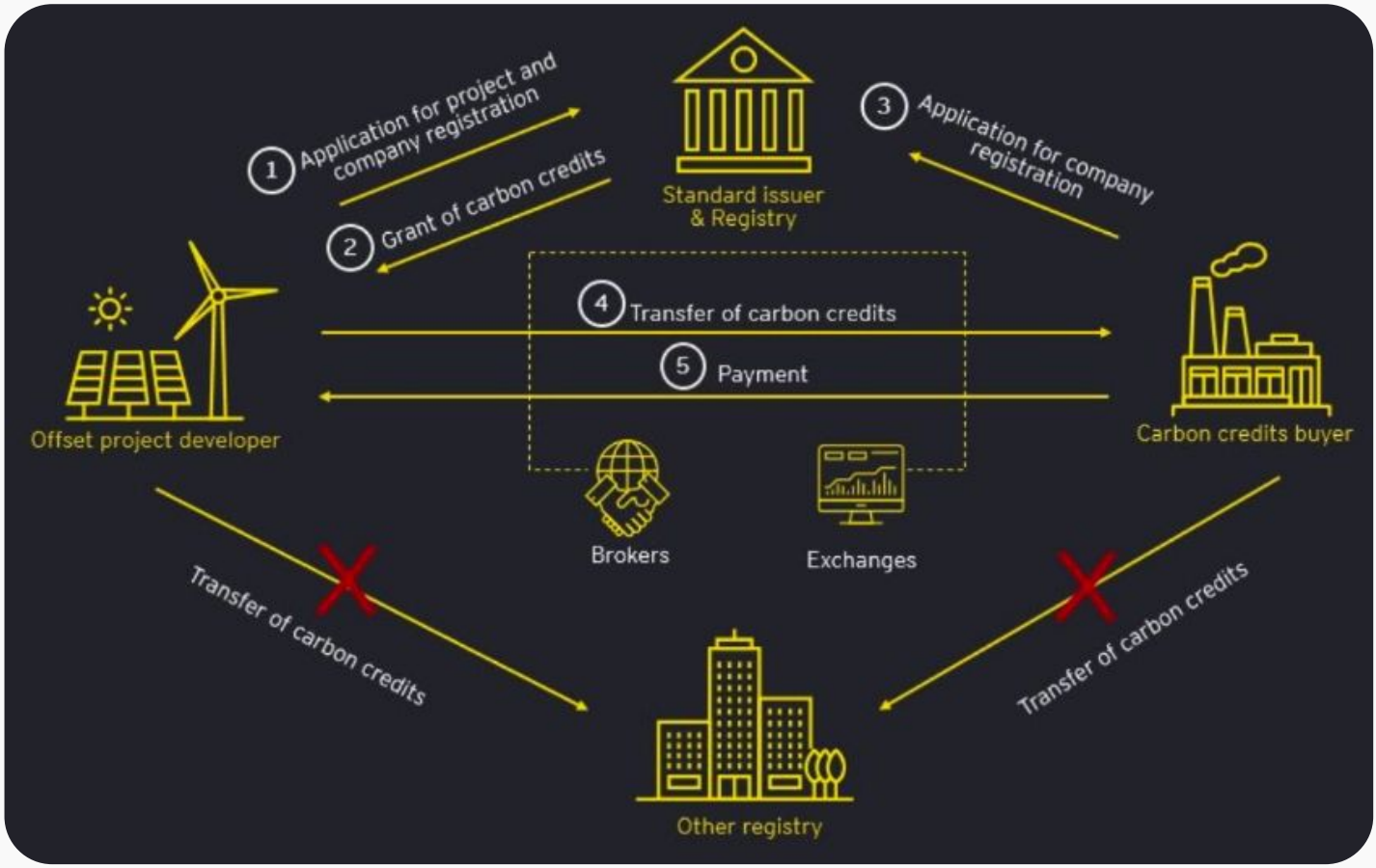
VOC Credits Market Mechanics

Carbon markets exist as mandatory (compliance) schemes and voluntary programs. Mandatory carbon markets (which are also referred to as cap-and-trade programs, emissions trading systems (ETS[1]s) or allowance trading) represent a market-based approach to reducing carbon emissions. While emissions trading involves other greenhouse gases, such as methane and nitrous oxide, the predominant form of emissions trading encompasses CO2.

The **voluntary carbon markets** function alongside compliance schemes and enable companies, governments, non-profit organizations, universities, municipalities, and individuals to purchase carbon credits (offsets) on a voluntary basis. Currently, the majority of VCCs are purchased by the private sector, where corporate social responsibility goals are typically the key drivers (ISDA, 2022).

For example, a carbon credit issued by VERRA is stored at VERRA Registry and cannot be moved to the Impact Registry operated by The Gold Standard (EY, 2021).



Based on VERRA Registry Terms of Use (EY, 2021)

In contrast to the highly regulated mandatory carbon market, **voluntary carbon markets do not currently involve any direct government or regulatory oversight.** VCCs are issued by multiple non-governmental issuing bodies globally, known as carbon standards. Each carbon standard has unique rules that all projects must follow to be certified. I.e., established carbon standards include the Verified Carbon Standard (VCS or Verra), the Gold Standard, the American Carbon Registry and the Climate Action Reserve. There are no legal, regulatory, or other third-party restrictions on entities setting the standards or on how the standards are set and maintained for any VCC.

[1] ETS - Emission Trading System

VCCs are recorded on various registries, each with different rules. These are centralized recordkeeping systems of all registered projects for which VCCs are issued. The registry tracks the generation, issuance, transfer, retirement, and cancellation of VCCs. The methodology, location and specific social and environmental benefits associated with each project all have a direct impact on the quality of the resulting VCCs and the price at which the VCCs are marketed.

Many corporate buyers purchase VCCs intending to cancel or retire them7 as a means to offset their own emissions. Once cancelled or retired, a VCC is removed permanently from circulation and cannot be traded anymore or used to offset further emissions. Currently, no universal registry for VCCs exists, although the World Bank has been promoting a global climate warehouse or 'meta registry'. The registries generally act as standard setters and lack direct oversight by a third party except when the registries also house regulated credits, such as California's Offset Project Registries (ISDA, 2022).

Each standard establishes its own eligibility criteria for projects that it registers, as well as for entities that can obtain access to the registry and thus trade in carbon credits. For example, VERRA does not accept individuals, Plan Vivo focuses on smallholders and community groups, while American Carbon Registry is dedicated to projects in the U.S.

To make things even more complicated, the naming of VCCs is not unified either. Gold Standard refers to them as carbon credits, VERRA designates VCCs as Verified Carbon Units, while Plan Vivo uses the term of Plan Vivo Certificates (EY, 2021).

The absence of governance entails difficulties in legal qualification of voluntary carbon units. In the European Union, carbon allowances under the EU Emission Trading System are classified under MiFID II as financial instruments. Voluntary carbon credits are neither included in this qualification, nor assigned a unified definition across the European Union. Instead, each member state treats VCCs at its own discretion (EY, 2021). In the context of US financial regulation, VCCs are commodities for the purposes of the Commodity Exchange Act (CEA) given the broad definition of the term 'commodity' under the CEA. This gives the CFTC varying degrees of regulatory and enforcement authority over primary and secondary markets in VCCs (ISDA, 2022).

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Carbon Climatech Solutions Potential Buyers

32 Companies/Projects at a different stage of development could be potential buyers for the carbon and carbon emission tech solutions and services.

#	Name	Description
1	CEEZER	Based in Berlin, German. Total Crunchbase Seed funding - USD 5.2M. Rethinking the voluntary carbon market as a digital-first carbon bank - giving companies seamless access to high-quality carbon removal while facilitating climate action globally. This company creates beautiful technology to make planet better. It is a digital-first carbon bank that gives companies access to and guidance through the complex voluntary carbon market. Company builds the digital infrastructure to transform voluntary climate investment into high-impact climate action through infrastructure, data, and collaboration. URL: www.ceezer.earth
2	Carbonfutre (Lockwood, 2022)	Based in Germany. Total funds raised: $2.8 million Backers[2]: Übermorgen Ventures, Wi Venture, and seed + speed Ventures. Biochar tracking and carbon-credits trading platform Carbonfuture. Carbonfuture's founders wanted to certify biochar projects but found the technical and financial solutions were not in place to do so, so set about building them first. Biochar is a form of charcoal that prevents CO2 from entering the atmosphere. It is made from organic materials that would otherwise be wasted, like crop residue. The materials are exposed to high temperatures and low oxygen to create biochar. URL: https://www.carbonfuture.earth/
3	Puro.earth (Lockwood, 2022)	Based in Finland with undisclosed funding. Undisclosed Backers: Finnish energy company Fortum and Nasdaq, which acquired the company last year. It has built a carbon-removal standard, registry, and marketplace. The startup has established its own standard and methodology for engineered carbon removal, including for biochar, construction materials, soil amendments, and carbon capture and storage (CCS). Methodologies can be downloaded and used by project operators to ensure they meet Puro.earth's criteria. The company claims on its website that its credits are verified by a third party and that projects are guaranteed to remove carbon from the atmosphere for at least 50 years. URL: https://puro.earth/
4	Pina Earth (Lockwood, 2022)	Based in Germany with total raised USD 500k. Backers: Y Combinator. Company certifies the carbon-storage capabilities of forests. Setting up a forest carbon project currently entails high costs, long lead times, and requires expert guidance, according to Pina Earth. The company is building a platform to certify a forest's carbon storage capabilities and connect landowners to carbon-credit buyers in an effort to improve access to the voluntary carbon market for smaller landowners. To assess the carbon sink of land, Pina Earth uses remote sensing, AI-based data analysis, and process digitalization. It simulates forest carbon storage based on aerial data and forest growth, modeling future scenarios to account for changing environments and establish the forest's carbon-storage capabilities under climate change. The startup hopes this will increase the speed and quality of carbon credits from forestry. It expects to issue its first carbon credits later this year. URL: https://pina.earth/en

[2] Backers - Supporters with funds, same as Investors

5	BeZero Carbon (Lockwood, 2022)	Based in UK, Total raised USD 3.9M. Backers: Illuminate Financial Carbon-credits rating agency. BeZero Carbon has built a platform to inform people buying, selling, and investing in carbon credits on their quality. It calls itself the first global, full service rating agency for the voluntary carbon market. Its technology provides data, analytics, and offsetting project ratings in an attempt to bridge the gap between the price and the quality of carbon credits. "Our carbon-credit ratings allow all market participants to price and manage risk, enhancing liquidity and encouraging improvement in project quality," the company told Insider. Its 50-strong team combines expertise across climatic and earth sciences, remote-sensing technologies, sell-side financial research, data and analytics, engineering, and public policy. "The voluntary carbon market was missing an independent-risk and quality-assessment framework to help with its pricing and risk assessment — we are providing the market with this framework," the company said. "The cornerstones of our approach to ratings are transparency and disclosure, as demonstrated by our publicly available rating methodology." URL: https://bezerocarbon.com/
6	Agreena (Lockwood, 2022)	Based in Denmark, Total raised 26.9 M. Backers: Kinnevik, Giant Ventures, Danish state fund Vaekstfonden, and farmer angel investors Helps farmers get paid for carbon sequestration. Agreena is helping farmers get paid for turning their land into carbon sinks. The 48-person company was originally founded as a commodity-trading marketplace for farmers in 2018 but pivoted to become an internationally accredited soil carbon certification program in 2021. Today, it is focused on quantifying, monitoring, and reporting emission offsets, reductions, and enhanced removals from regenerative agriculture and soil carbon sequestration. Farmers can then earn carbon credits for their efforts and sell them on the voluntary carbon markets. "Reaching the 1.5-degree warming target by 2050 will require not only emission reductions but actually negative emissions," Simon Haldrup, cofounder and CEO, told Insider. "In this phase of the market, both farmers and innovation are stepping center stage, as we need to be removing carbon from the atmosphere." Haldrup said he wished the climate crisis did not exist, but that the voluntary carbon market is a "critical response." "One-third of the world's largest publicly traded corporations have already committed to net-zero targets, and on the path to climate neutrality, demand for quality carbon certificates will increase significantly," he added. URL: https://agreena.com/
7	Single.Earth (Lockwood, 2022)	Based in Estonia. Total raised: $7.9 million. Backers: Sweden's EQT Ventures. Is tokenizing carbon credits for forests and grasslands. Single.Earth is the result of a hackathon on the future of wood, in which cofounder Merit Valdsalu set out to find a solution to disincentivize forestry destruction after growing up watching Estonia's "intensive forestry." "Our forests are cut down for timber; we wanted to find a way to stop that, to help landowners keep forests growing," Together with cofounder Andrus Aaslaid, the pair set about monetizing nature for "something more than just raw materials" to help finance nature protection. Regenerative forestry problems are important, Valdsalu said, but forests and biodiversity are still being lost while new ones are being planted. The 70-person startup is connecting forest or wetlands landowners with carbon-credit buyers through its platform. It uses digital twins, satellite imagery, and on-the-ground

		reporting to estimate when the land has sequestered 100 kgs of CO2 and issues a token. Traditional carbon credits represent one ton of CO2 or equivalent. As the system is built on blockchain, the token then goes into the landowner's digital wallet and they can use it to buy, trade, or offset emissions. If the latter, the token is taken out of circulation and used up. Valdsalu added that the "beauty" of Single.Earth's system is that there is a cap on the number of tokens that can be in circulation based on how much CO2 the environment can sustain today, so no tokens are pre-issued. URL: https://www.single.earth/
8	Toucan (Lockwood, 2022)	Based in Switzerland. Total raised: Undisclosed. Backers: Undisclosed. Is creating a new, regenerative financial system. Toucan is on a mission to build a decentralized climate-finance ecosystem, which it hopes to achieve by bringing carbon credits onto the blockchain through tokenization. Toucan is building the infrastructure to do this, "enabling a new regenerative financial system that represents the Earth as a silent stakeholder," strategy and ecosystem lead John Hoopes IV told Insider. Hoopes said that over 20 million tons of carbon have been tokenized using Toucan infrastructure. Each carbon credit that is tokenized is recorded on Toucan's blockchain-based registry, meaning there can be no double counting and every credit is trackable and accounted for. Settlement is global and happens in seconds, and anyone with a smartphone can participate, Hoopes said. While the tokenization of carbon credits is gaining popularity among the climate-conscious crypto community, Toucan founder Raphaël Haupt told podcast "Climate Tech Cocktails" that the company hopes to expand past offsets and find new incentives for the purchase of carbon credits. URL: https://toucan.earth/
9	ClimateSeed (Lockwood, 2022)	Based in France. Total raised: Undisclosed. Backers: Undisclosed, acquired by French investment managers AXA. VCO platform -ClimateSeed is a voluntary carbon-offsetting platform that helps companies calculate and manage greenhouse gas emissions through its consulting team. It works with 30 emission-reduction projects, including nature-based solutions, in more than 20 countries and offers carbon credits to corporate customers on its marketplace. ClimateSeed told Insider it has a robust verification process, including project certification, banking due diligence, anti-money-laundering assessment, and projects that must be validated by its internal sustainability committee. Rather than the amount of sequestered carbon, the startup focus on projects' wider quality, social, and environmental impacts. "This view contrasts with the voluntary carbon market's direction in which price is the prime driver, and carbon credits are treated as assets for trading, forgetting the fundamental role of projects against climate change," the company said. "ClimateSeed is against the commoditization of carbon credits. It aims to work with project developers and clients who seek to generate maximum social and environmental impact to truly support the conservation of our planet, biodiversity, and local communities." The platform allows project developers to fix the price of their carbon credits. URL: https://climateseed.com/
10	Sylvera (Lockwood, 2022)	Based in UK. Total raised: $39.5 million / Backers: Index Ventures, New York firm Insight Partners, Salesforce Ventures, and LocalGlobe

		Company rates carbon-credit offsetting projects. Sylvera rates carbon offsets in efforts to build trust in the voluntary carbon markets, which has been plagued with double counting and varying project qualities. The cofounders, Allister Furey and Samuel Gill, first had the idea to create a monitoring platform to hold projects accountable. "What we realized was that actually when you look at quality in carbon offsets, it's actually quite a bit more complicated than that," Gill told Insider. "You need to understand, yes, if the project doing what it's saying is doing, but there's this whole question around additionality. Is the project actually responsible for the impacts that it is claiming?" In some cases, benefits are overestimated, Gill said. The startup uses 3D scans and satellite imagery to establish the structure of a forest and estimate how much carbon is stored in it. This is paired with environmental data, such as the risk of a forest fire, the operator's track record, and what has happened in the forest over time, to establish a rating. It is currently restricted to nature-based solutions like forestry but plans to expand and rate projects providing less-polluting cooking stoves in developing countries. The company's customers and partners include Bain, Cargill, and the World Economic Forum, according to its website. URL: www.sylvera.com
11	Likvidi (Lockwood, 2022)	Based in Luxembourg. Total raised: $2 million. Backers: DAO Maker Is a platform for tokenizing and trading carbon credits. Likvidi is a green finance platform to trade and manage tokenized carbon credits. The company has built a blockchain-based carbon-credit exchange that runs on Avalanche, a platform for smart contracts. It brings carbon credits approved by Verra, one of two main carbon-credit-standardization bodies, onto the blockchain by tokenizing them. Likvidi hopes to improve access for both companies and individuals to the voluntary carbon-credits market, to in turn help it scale. "The world is now waking up to the challenge of reducing carbon emissions," CEO and cofounder Ransu Salovaara told Insider. "Governments alone won't achieve this, so private companies must follow the examples of Microsoft and Google in going carbon neutral. Likvidi will enable companies to securely and transparently trade carbon credits, to offset carbon emissions and to incentivize them to sponsor the protection of our vital ecosystems." URL: https://www.likvidi.com/
12	xpansiv / Digital Carbon Removal Assets™	Xpansiv is the global market infrastructure for registering, managing, trading, settling, retiring, analyzing, and reporting an infinite array of data-driven environmental commodities in an intuitive, user-friendly environment.Introducing Digital Carbon Removal Assets. In order to mitigate climate change, Xpansiv developed the Digital Carbon Removal Asset, a tradeable, non-tangible environmental asset that represents proof that a metric ton of carbon dioxide (CO2) was captured from the atmosphere and stored and/or sequestered in a secure geologic formation or manufactured material. URL: https://xpansiv.com/
13	Carbon Block	Is a Canadian startup offering environmental auditing solutions to promote decarbonization. Carbon Oracle sensor gathers real-world data and converts it into carbon offsets. It automatically validates measurements, thus, eliminating the need for intensive manual inputs. After quantifying the emissions reductions as a blockchain token, the startup facilitates its sale to corporate buyers. URL: https://carbonblock.io/

14	AirCarbon	Singaporean startup AirCarbon develops a blockchain-based carbon trading platform. Each AirCarbon CORSIA Eligible Token (CET) is backed by 1 tonne of equivalent carbon dioxide. The startup's token is eligible under the Carbon Offset and Reduction Scheme for International Aviation (CORSIA). It also offers a token for carbon credits related to wetlands, grassland forestry, and agriculture. URL: https://www.aircarbon.co/
15	Pathzero	Australian startup Pathzero builds a carbon management platform for small and medium sized businesses. The startup's carbon marketplace provides access to high-quality projects to companies to offset their residual emissions. It also offers a calculator to identify the number of carbon offset credits a company needs to reach net zero. The startup's solution also meets global certification and reporting standards. Builds Carbon Management Platform - While large companies contribute to the majority of carbon emissions, the emissions from small and medium companies also add up to have a significant impact. This is why they are also looking to trade carbon credits. This allows companies to immediately become carbon-neutral or even carbon-negative, a status that may enhance brand reputation and provide tax reliefs. URL: https://www.pathzero.com/
16	ClimateTrade	ClimateTrade is a Spanish startup that helps companies meet carbon emissions offsetting goals. It connects developers of mitigation projects with companies interested in sustainability. The platform features diverse projects and offers full automation, speed, and traceability. In addition to carbon emissions offsetting, the startup offers carbon footprint calculation and enables companies to offer carbon-neutral products or services to their customers. It enables Carbon Emissions Offsetting Companies look to offset their carbon emissions by investing in projects aimed at emissions reduction, carbon capture, or preventing further carbon emissions. However, it is often a challenging task to find trustworthy projects. Moreover, companies need to calculate their carbon footprint to figure out their offsetting needs. This is why energy startups offer solutions that make carbon emissions offsetting easier. URL: https://climatetrade.com/
17	Carbonex	British startup Carbonex develops a global carbon exchange platform. It converts carbon credits into a CBN coin that companies can trade like traditional currency. The startup also plans to embed carbon credit tokens in smart contracts. The startup's solution allows companies to tackle the threat of global climate change. Carbon credits allow companies to balance their greenhouse gas (GHG) emissions with carbon offsetting projects anywhere in the world. However, there is a lack of standardized methods to validate the authenticity of carbon credits. Owing to the security, immutability, and traceability of blockchain technology, startups are leveraging it to bring these features to carbon credits. URL: https://carbonex.co/
18	Climeworks	Carbon Sequestration Year by year, human activity is causing an increase in carbon dioxide levels in the atmosphere. Due to the fact that the sustainability capacity of urban ecosystems is not infinite, modern smart cities have to reduce their CO2 amount artificially. Contemporary technological developments assist in capturing carbon from the air directly through using membranes (filters), absorption or adsorption, followed by underground storage, carbon sinking, or carbon reuse. Switzerland-based Climeworks utilizes a cost-effective filter, made of special material (porous granulates modified with amines) to capture CO2 directly from the air. The latter comes into the filter, where chemical reactions lock carbon inside

		and release carbon-free air. Afterward, bound CO2 undergoes a heating stage – powered mostly by waste heat – and is collected for storing or secondary purposes. URL: https://climeworks.com/
19	Carbicrete	Carbon Upcycling Carbon upcycling addresses the challenges of carbon-negative development in smart cities. It transforms carbon waste and emissions into materials and goods, which are suitable for secondary use, in the form of soil fertilizers, construction additives, road coverages, and nanomaterials. As a result, carbon undergoes a full lifecycle and does not contaminate the atmosphere further. Canadian Carbicrete manufactures carbon-negative concrete blocks using carbonation activation technology. It supplants carbon-intensive cement by steel slag / industrial waste and then cures the mix with CO2 to make it solid and durable. As more carbon is consumed than emitted, it helps Smart Cities to lower their carbon footprint and become carbon-negative. URL: https://carbicrete.com/
20	BioCarbon Engineering	Urban Reforestation By moderating heat islands and improving air quality in smart cities, urban reforestation tackles problems induced by the rapid growth of modern urban environments. Urban reforestation occurs on the basis of vertical farming, robotic planting, or drone-powered seeding. BioCarbon Engineering from Australia intends to restore destroyed natural ecosystems through substituting a time-consuming manual tree planting with seeding drones. The solution includes mapping, direct seeding, and precision pod planting, combined with area monitoring and data analytics. URL: www.biocarbonengineering.com
21	NRGcoin	Based in Belgium Is an industry-academia project that was originally developed at the Artifical Intelligence Lab of the Vrije Universiteit Brussel. The NRGcoin mechanism replaces traditional high-risk renewable support policies with a novel blockchain-based Smart Contract, which better rewards green energy. See below more about the concept and how it benefits different parties. URL: https://nrgcoin.org/
22	Sync Energy A	developed a no-code AI-based predictive software platform that streamlines planning and operations for electrical utilities, especially during emergencies like weather events. URL: https://www.syncenergyai.com/
23	Rebase Energy	is a startup that created a platform that helps utilities by enabling the creation of energy AI forecasts in just minutes. URL: https://www.rebase.energy/
24	Overstory	uses carbon neutrality technology as a solution that analyzes all vegetation on Earth to prevent wildfires and power outages, enabling smarter infrastructure management and safer communities. URL: https://www.overstory.com/
25	Kuva Systems	is an industrial IoT solution that continuously monitors and quantifies the intensity of methane and VOC emissions. URL: https://www.kuvasystems.com/
26	DynamHex	offers a decarbonization enterprise software that helps cities and companies target climate action and measure results.

		URL: https://dynmhx.io/
27	Ev.energy	provides utilities with managed EV charging services in the home. Their software platform is hardware-agnostic and connects wirelessly to a range of hardware to maximize the total controllable load for utilities. URL: https://ev.energy/
28	SineWatts	Has designed a Universal OBC that replaces the existing integrated onboard charger (OBC). The Universal OBC enables unified and bidirectional Level 1, Level 2, and Level 3 fast charging. URL: https://www.sinewatts.com/
29	Kanin Energy	Is a startup that helps heavy industry monetize their waste heat and decarbonize their operations. URL: https://kaninenergy.com/
30	Carbon Grid Protocol	Digital Carbon Offsets - Carbon offsets act as incentives for individuals, businesses, and governments to balance their CO2 footprints by co-financing carbon reduction programs. Converting carbon offsets into digital assets and leveraging them by blockchain aims at tokenizing carbon credits so as to achieve more transparency and efficiency in managing a greenhouse gas emissions cut. Carbon Grid Protocol from Singapore makes the carbon market more decentralized and transparent by connecting the digital world with real-world carbon emission offsets. It develops the CGRID platform, which represents a complementary protocol layer enabling blockchain networks & DApps to access carbon credits (tokens), track CO2 emissions, and create a digital carbon exchange ecosystem. URL: http://carbongrid.io/
31	Carbon Clean	Provider of solutions for carbon capture for industries. The platform provides a system that captures and deliver industrial quality CO2 for re-use or sequestration. It provides a modular and semi-modular system for carbon capture. Additionally, It provides solutions for steel, cement, refineries, and energy industries. URL: https://www.carbonclean.com/
32	LanzaTech	Provider of a bio-processing platform intended to improve waste carbon treatment Provider of a bio-processing platform intended to improve waste carbon treatment. The company offers a carbon recycling technology to capture, re-use, and recycle carbon from industrial off-gases and syngas generated from biomass resources, enabling the monetization of local gas sources. URL: https://lanzatech.com/

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About Unicsoft

Unicsoft is a recognized expert in the world of digital transformation, empowering business to innovate. We provide professional software development services for sustainable growth of SME and startups worldwide.

With our help and the client-centered mindset we cultivate, many of our clients were able to get back on track and grow in 2008-2011. An excellent client experience is our priority. We achieve this through clear and timely communication, delivering on promises, and our “going the extra mile” attitude.

Now, we want to do the same for your business. This is a great time to help your company get ready for the oncoming economic recession and provide tools and services that will help you succeed long-term while conquering new markets.

We currently hold numerous brainstorming sessions with our team members and clients to find the best approaches to keeping their businesses afloat or even prospering in the current situation.

If you would like to hold a similar session for your business, don’t hesitate to contact us anytime and our experts will gladly examine your specific case.

Thank you

We would like to thank you for the time you invested in reading through our analysis. We hope you found the information useful. Also, we are grateful to all the respondents for taking part in this survey. Your answers helped us understand the reality of the situation for various businesses worldwide.

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