

Mission 6

White Paper

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A Proprietary Carbon Offset Validation Ecosystem that makes sustainability profitable and tradable for the mass market

This white paper is a working document subject to review and change.

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This white paper contains certain forward-looking statements regarding the business we intend to operate that are based on current assumptions and beliefs of Mission 6 as well as certain assumptions made by and information available to Mission 6 forward-looking statements, by their nature, are subject to significant risks and uncertainties.

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Mission

Our mission is to reduce carbon emissions by 5 billion metric tons per year starting with carbon offsets generated by energy efficiency projects traded through cryptocurrency exchanges.

Vision

Our vision is to stimulate market-driven carbon displacement through the first cryptocurrency backed by certified and secure carbon offsets. Quantification, validation and certification through a proprietary Measurement & Verification platform built compliant with international testing protocols, will attract critical mass participation from large and intermediate carbon emitters, Environmental and Social Governance (ESG) programs for businesses and institutions, impact investors, and cryptocurrency investors interested in sustainability.

Executive Summary

Humans emit approximately 32 billion metric tons of carbon each year. It is estimated that the 2-degree tolerance threshold will be eclipsed once carbon emissions surpass 565 billion metric tons. Retarding the emissions is key to providing more time to develop next generation carbon capture and sequestration technologies. The existing carbon trade markets are antiquated, non scalable, and failed to influence the effort in any meaningful way.

Mission 6 is premised on a core belief that mass participation in carbon reduction will most effectively be achieved through technology (AI, machine learning, IoT, and forensic engineering), market forces, and profitability. Markets can drive machine efficiency, user accountability and induce ESG investment through economic incentive. The Mission 6 ecosystem identifies and certifies carbon emission offsets generated by energy efficiency projects that are ignored due to complexity of validation.

Significant new segments of quantified, validated, certified and secure carbon offsets will be brought to market at scale, facilitating mass participation. HVAC efficiency upgrades, LED lighting replacement, and energy optimization have largely been excluded from the carbon trading space. Enticing and recruiting emitters who have a successful track record of GHG footprint reduction will “prime the pump” with ready supply and incent peers to follow. An incentive that is universally accessible will have a greater impact on global carbon reduction.

A “first things first” approach targets core machine energy efficiencies to reduce carbon emissions. Additional carbon mitigation strategies will be added to the Mission 6 scope in latter phases after significant progress has been made in generating carbon offsets from energy efficiency projects. Carbon removal from the atmosphere is critical but futile if ongoing emission is not curtailed. The *biggest* and *most certifiable* carbon reduction opportunity is the elimination of core energy inefficiency at the unit.

HVAC: Major Contributor to Global Warming

A lead contributor to escalating carbon emission is the expansion of HVAC across the globe. By 2050, HVAC will draw at least 25% of all energy from the global grid. All advances that are made in the renewable energy to supply this demand must be reconciled before real progress can be made in global carbon reduction.

HVAC accounts for more energy than any other energy-consuming component in a building. Most HVAC systems degrade over time and operate 30-50% below OEM design energy efficiency. The efficiency loss equates to 1.82 billion metric tons of carbon emissions per year. This waste is unnecessary and avoidable. Current technology can reverse this inefficiency and is a necessary first step in mitigating HVAC's ongoing climate impact.

Mission 6 has a nationally recognized HVAC forensic engineering team and extensive enterprise software expertise. In 2017, Mission 6 developed the first software platform to quantify and validate HVAC/R energy efficiency performance in the field. This patent-protected platform produces end-to-end diagnostic, lab quality testing results for in-field systems every few seconds. It was designed and built strictly adherent to ASHRAE, AHRI, international testing protocols and Standards and Accounting Board guidelines. The platform employs a forensic engineering efficiency process in real time to mitigate variables. ASHRAE recognized the Platform as a "breakthrough technology of 2017".

No efficiency gain is recognizable or legitimately tradable unless quantified, validated and certified according to governing body standards. Mission 6's FMV Platform identifies, measures, validates and certifies carbon displacement value based upon a HVAC unit's core operating efficiency. Core efficiency is unaffected by operator control.

Offsets, or corresponding M6 tokens, anchored to block chain are awarded. The producer, subsequent purchasers and the marketplace can trust the assigned intrinsic value as well as its trading security and legitimacy.

Offsets are also available for producer retention or future conversion. Mission 6 will also certify efficiency outcomes for NFT projects and issue corresponding tokens for trading supply.

Crypto Mining Redefined

Mission 6 redefines the process of “mining” and Proof of Work (PoW) employed by other cryptocurrencies, like bitcoin.

- PoW becomes the mitigation of carbon, not the creation of the block chain, through our patent pending Proof of Certification (PoC) process.
- The use of fungible and non-fungible tokens is combined on the M6 block chain.
- Efficiency project costs vary. Each technology saves different amounts of energy and carbon emissions avoidance varies. Carbon avoided will be certified in offsets and a NFT issued (Non-Fungible Token).
- NFT projects can translate to fungible cryptocurrency, easily traded on exchanges.

Public Ledger

Mission 6 ECMs (Energy Conservation Measures) will be processed as certified EE-NFT (energy efficiency, non-fungible token) projects with a certified carbon reduction. They can be claimed (burned) by the owner, sold as individual NFTs or traded for M6 coins. The EE-NFT projects and any tradable M6 coins will be recorded on block chain for authenticity and accessible on a public ledger.

Free Market

M6 coins can be valued and exchanged in any free market. The cryptocurrency will have an original intrinsic value derived from certified carbon displacement from core efficiency improvement as measured, e.g., SEER or Star ratings. The final assigned carbon reduction value, and token supply awarded, is the product of a standard formula factoring certified carbon displaced over useful life, weighted against national HVAC carbon footprint and scarcity of M6 token supply.

Current Carbon Market Failures

As carbon emission levels continue to rise it is evident that government and existing carbon markets have failed to achieve the desired outcome.

Key factors:

1. **Government Regulation** - There have been numerous attempts to regulate emissions however results consistently fall short of expectation.
2. **Lack of Visibility** - Current carbon markets have not achieved wide-scale acceptance or critical mass participation. Reasons vary from market to market. The supply of carbon displacement is ever growing and ESG demand interest is increasing exponentially. Current marketplaces lack visibility despite the growing need of companies who want to offset their carbon footprint through supporting projects that reduce emissions. They don't know who to engage with or how.
"The whole world is talking about carbon offsetting, but very few people understand how offsets are traded or what they should cost." - ctxglobal.com
3. **Carbon Capture vs. Avoidance via Efficiency** - Existing Carbon Markets have failed to include the most substantial energy conservation measures (ECMs) such as HVAC, LED, and new efficiency technologies that mitigate carbon. Most carbon projects are restricted to forest and grassland management, livestock, and carbon capture projects. The majority of projects that are reducing emissions are not accounted for nor valued. Also, the existing private carbon marketplaces do not have the domain experience in Energy Conservation Measures (ECM) projects to accurately validate them.
4. **Public Accountability** – To date, there has been no way to effectively prevent suppliers from selling the same carbon offsets multiple times in a fragmented marketplace. No global ledger of authenticated offsets exists. Trade reporting must be immutable, accurate, and global to prevent fraud. More fundamentally, the generated carbon offset should be auditable as valid both in effect and quantity before used as a legitimate offset.
5. **Purchased offsets are an OPEX expense** - If a business is forced to purchase carbon offset as an operational expense there is resistance and limited participation.

Mission 6 is the Solution

Mission 6 is an ecosystem that quantifies, validates and certifies avoided carbon emission.

M6's Find Measure Verify & Platform (FMV):

- Was designed and built in compliance with international standards testing protocols
- Certifies the quantification, authentication and avoidance of carbon emissions using industry best practices and standards
- Facilitates the most progressive carbon trading process in the market by employing a state of the art Measurement and Verification (M&V) software platform, specialized hardware for forensic analysis utilizing international standards testing protocols, and block chain software to record a public ledger
- Creates economic incentive to reduce carbon emissions that does not rely on governmental or social pressure

This concept is also outlined in the book GREEN THINK; How Profit can Save Our Planet by Rick Fredrizzi, The CEO of the U.S. Green Building Council (USGBC).

Profitable Sustainability Model

Sustainability and carbon emissions credits have always met resistance due to cost. Government regulation is necessary but viewed as a form of taxation. In order to overcome the resistance and encourage mass participation, there must be an economic incentive for all parties involved. Mission 6's model allows carbon offsets to be traded for cryptocurrency and can mitigate the expense of the project.

Cryptocurrency

Cryptocurrency backed by carbon as a medium of exchange, and the marketplaces that support digital asset trading will enable global participation and visibility to existing carbon reduction projects.

To solve the climate crisis we need momentum, public access, the mitigation of carbon, and a free marketplace. The Mission 6 cryptocurrency is backed by the measurement of carbon reduction.

Creation of Value

Carbon offsets are created (mined) through projects that create carbon offsets. Participants in projects are given the opportunity to exchange carbon offsets for currency (coin) for their contribution to reducing carbon. This built-in currency option serves the dual purpose of providing a primary liquidity layer to allow for efficient exchange of carbon offsets, and a mechanism to offset expenses, fund transaction fees or fund new carbon offset projects. Most cryptocurrencies have very little utility and are speculative based on perception of future value. Some others such as DOGE, SHIBA have no real value or utility and are subject to the most risk based on 100% speculation.

M6 cryptocurrency is:

- backed by a tangible asset that is the central element in a worldwide crisis;
- a catalyst to mass participation in solving the climate crisis;
- an evolution of carbon markets that have failed to achieve their intended goal;
- the next-generation carbon currency to lead market-driven sustainability.

The Current Block Chain Mining Model

Current mining operations require significant financial investment to create and acquire cryptocurrency. In addition to the purchase of computer equipment and energy, there is also the need of acquiring facilities or fees for the use of data centers, and the cost of labor.

Proof of Work (PoW)

Mining digital currencies via the Proof of Work (PoW) strategy requires substantial amounts of resources, computing power, and energy consumption to facilitate discovery of each coin.

The amount of power used globally running servers used in mining Bitcoin surpasses the amount of energy used in 139 countries individually. Since sustainability is a driving factor, the energy used in digital mining has come under much scrutiny. The proof of work (PoW) consensus algorithm requires each node in the Bitcoin network to solve a problem. The first node that solves the problem is granted permission to add a new block and the miners are awarded Bitcoin for their work. The nodes are the administrative body of the block chain and verify the legitimacy of the transactions in each block. Once a block of transactions has been verified, the data is written into the block chain.

Proof of Stake (PoS)

Proof of Stake (PoS) gives mining power based on the percentage of coins held by a miner and does not require the owner to conduct the work necessary to earn ownership of the digital coin. The amount of energy used in the Proof of Stake strategy is less than in the Proof of Work strategy but there is still the need to use energy to power the platform. The amount of energy used per coin is now a comparison point that is being used to sway participants into purchasing their coin compared to others based on it using being less harmful to the sustainability movement.

The proof of stake (PoS) consensus protocol was created as an alternative algorithm seeking to address the scalability and environmental sustainability concerns surrounding the proof of work (PoW) protocol.

Proof of History (PoH)

The Proof of History is a high frequency Verifiable Delay Function. A Verifiable Delay Function requires a specific number of sequential steps to evaluate, yet produces a unique output that can be efficiently and publicly verified. Instead of trusting the timestamp on the transaction, you prove that the transaction occurred sometime before and after an event.

Proof of History is a sequence of computation that can provide a way to cryptographically verify passage of time between two events. It uses a cryptographically secure function written so that output cannot be predicted from the input, and must be completely executed to generate the output. The function is run in a sequence on a single core, its previous output as the current input, periodically recording the current output, and how many times it has been called.

The output can then be re-computed and verified by external computers in parallel by checking each sequence segment on a separate core. Data can be time stamped into this sequence by appending the data (or a hash of some data) into the state of the function. The recording of the state, index and data as it was appended into the sequences provides a timestamp that can guarantee that the data was created sometime before the next hash was generated in the sequence. This design also supports horizontal scaling as multiple generators can synchronize with each other by mixing their state into each other's sequences.

A New Approach to Mining

The M6 coin represents the mining of real carbon offsets. It is the only cryptocurrency that has a **positive impact on sustainability**. M6 is revolutionary because it reallocates mining investment to sustainability projects that are energy conservation measures (ECM) implemented to mitigate energy use. M6 uses an environmentally friendly Proof of Certification block chain.

- Corporations, investors, and individuals can participate in mining pools.
- The mining pools fund carbon NFT projects that are measured, validated, and certified by Mission 6.
- Carbon NFT's can be swapped for M6 currency.
- Carbon emissions that are mitigated or sequestered are valued directly to the M6 coin.
- Every M6 coin has a tangible value to a real world carbon offset.

Block Chain

Mission 6's Block chain and smart-contract platform supports both non-fungible (NFT) and fungible digital assets. It is a global decentralized platform that is fast, scalable, and offers low cost transactions. These requirements are fundamental in creating global value for M6 currency.

Immutable Public Visibility

Mission 6's ecosystem will use a global immutable ledger and smart contracts that are both private and public to track all of its NFT and currency transactions. Block chain software allows for a secure permanent record of each transaction, preventing the problem of multiple parties from claiming offsets based on the same carbon projects. A public register is available for any party to learn which projects have been created, certified, and traded.

Scientific Verification of ECM Projects

Energy efficiency projects (Phase 1) are verified for saving kilowatt-hours and assigned a mitigated carbon value based on the amount of carbon used to produce the energy.

NFT Creation From ECM Projects

Mission 6 ECMS will initially be recorded as an Energy Efficiency NFT (non fungible token) on the block chain (EE-NFT). Projects may be traded as NFT's or swapped for M6 coin at their completion.

Corporate Support

Public trading of the M6 cryptocurrency allows participation in sustainability at the corporate or institutional level. Making an impact in sustainability will require mass participation. Government regulation of large emitters is an important step but is not the solution. There must be an economic incentive and a benefit to all participants.

Carbon Mining Phases

Phase 1

Mission 6 has identified HVAC as its first target for ECMs because it offers the most impact in carbon offset. Mission 6 has partnered with vendors of ECM technologies that specialize in HVAC that have offerings of tremendous value.

Energy efficiency projects are verified for saved kilowatt hours and are assigned a mitigated carbon value using the standards published by the U.S Energy Information Administration (EIA).

Companies offering HVAC technologies that improve efficiency can apply for certification with Mission 6. Once validated, EE-NFT projects can be certified for offsets or exchanged for M6 currency.

HVAC consumes the most energy in commercial buildings and loses more efficiency than any other component consuming power in facilities.

Lost efficiency in HVAC accounts for the largest opportunity in reduction of carbon emissions due to energy consumption.

Energy wasted by HVAC lost efficiency:

- HVAC/R accounts for an estimated 50% of electricity consumption in buildings
- 6-10% of total building electric use is wasted due to HVAC efficiency loss
- 2.6 Trillion kWh's are wasted annually
- 1.82 Billion Metric tons of CO₂ are emitted annually due to HVAC waste
- Annually 400 Billion US dollars is wasted as a result of this efficiency loss

“Making cooling more efficient would also yield multiple benefits, making it more affordable, more secure, and more sustainable, and saving as much as USD 2.9 trillion in investment, fuel and operating costs.” (International Energy Agency -May 2018)

Carbon Mining Phase 2

Non-climate control technologies such as LED lighting, EC Motors, Energy Management Systems or others that improve efficiency and reduce emissions will be the second category eligible for certification for Carbon NFT projects. Once technologies are validated, NFT projects can be certified for offsets or exchanged for M6 currency.

Carbon Mining Phase 3

Carbon capture and sequestration, renewable energy generation, as well as Methane and Nitrous Oxide mitigation programs will follow. Once technologies are validated, NFT projects can be certified for offsets or exchanged for M6 currency.

Validation Process

Each technology, regardless of the Phase will undergo a comparable process measured in similar fashion prior to determining the amount of carbon that was mitigated or sequestered and assigned to each carbon offset that is certified.

Example of the validation process for Phase 1 HVAC projects

The objective of measuring the overall cooling production of HVAC/R systems can be realized by measuring the total energy consumed by the specific unit being tested and the total BTUH production of the system then calculating these parameters to obtain current capacity, kW/ton, EER (energy efficient ratio) and COP (coefficient of performance). Using that information the total BTUH of cooling production can be realized.

The objective of measuring overall power consumed by an HVAC/R system can be realized by measuring voltage, amperage and power factor.

Total BTUH was developed along with total kW consumption by measuring all required data points (33 points - see below) and entering them into industry best practice engineering formulae.

All measurement hardware was certified under NIST or CE standards. Engineering formulae was developed by AHRI / ASHRAE (American Heating and Refrigeration Institute / American Society of Heating Refrigeration & Air Conditioning Engineers):

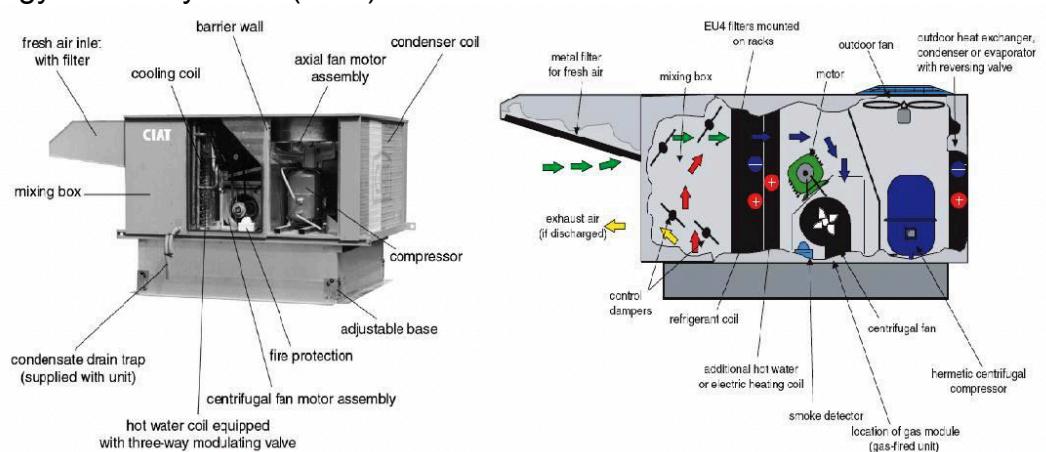
Kilo-watt (kW) = Volts (V) x Amps (A) x Power Factor (PF) x $\sqrt{3}$ / 1000 British Thermal Units (BTU) = CFM x 4.5 x Enthalpy Delta

Capacity / Tons = BTU / 12,000

Kilo-watt per Ton (kW/Ton) = kW Energy / Tons (capacity)

Co-Efficient of Performance (COP) = 12/kW per ton/ 3.412

Energy Efficiency Ratio (EER) = BTU / Watts



The CFM and inlet temperature/enthalpy sensors measure the entering evaporator air volume, dry bulb temperature and enthalpy. The outlet air temperature enthalpy sensor measures the evaporator leaving air temperature and enthalpy. The inlet and outlet enthalpies are subtracted from each other resulting in a sum called the Enthalpy delta. This enthalpy delta (Δ) is used in the shown formula below.

Other components of this formula complete the equation. These include the volume of air passing through the evaporator (CFM or Cubic feet of air per minute) and an engineering standard ratio of 4.5 (Ratio of Standard Air) or constant. The result of this calculation yields the industry standard the British Thermal Unit (BTU), which is used to calculate the unit's capacity in BTU. This BTU number is then divided by the constant 12,000 which is to convert to refrigeration tons because every 12,000 BTUs equals 1 Ton of HVAC capacity. The capacity formula is:

$$CFM \times 4.5 \times \text{Enthalpy } \Delta = BTUs / 12,000 = \text{Tons (capacity)}$$

CFM – Cubic Feet per Minute of Air Flow or Air Volume 4.5 – Ratio of Standard Air (constant)

To Determine Capacity

Enthalpy Δ - Enthalpy Delta of the Inlet – Outlet Enthalpy BTU – British Thermal Units
12,000 – every 12,000 BTUs equals 1 Ton (constant)

Example: 4000 (CFM) X 4.5 (Standard Air Ratio) X 8 (Enthalpy Delta) = 144,000 BTU, then divide by 12,000 = 12 tons

To Determine Electrical Energy Consumption

Total electrical consumption is measured at the main source of electric service of each rooftop unit. This includes, voltage, amperage and power factor and a constant of the square root of 3 ($\sqrt{3}$). This is then divided by 1000 to obtain kilowatts. The electrical formula for kilowatt (kW) is:

$$kW = V \times A \times PF \times \sqrt{3} / 1000$$

V – Voltage

A – Amperage

PF – Power Factor

$\sqrt{3}$ – Square Root of 3 for 3-phase Input Power 1000 – constant

Example:

480 (volts) X 45 (amps) X $\sqrt{3}$ (phase angle for three phase power only) X 0.90 (power factor) / 1000 = 33.67 kilowatts

To Determine Efficiency

Divide the measured kilowatts (kW) by the measured tons to obtain kW per ton. kW per ton is the industry standard to determine system efficiency.

Example : $33.67 \text{ kW} / 12 \text{ tons} = 2.80 \text{ kilowatts per ton}$

Points Measured

Delta Temperature	Wet Bulb Supply
Dew Point Return	
Dew Point Supply	
EER	
kW	
kW/ton	
Instantaneous Current, Phase A	
Instantaneous Current, Phase B	
Instantaneous Current, Phase C	
Air velocity in FPS	
CFM	
Compressors on/off	
COP	
Delta Enthalpy	
Delta Temperature	
Dew Point Return	
Dew Point Supply	
EER	
kW	
kW/ton	

Instantaneous Current, Phase A
Instantaneous Current, Phase B
Instantaneous Current, Phase C
Average Current
Voltage Phase AB
Voltage Phase BC
Voltage Phase CA
Average Voltage
Net Capacity
Outdoor Air Temp
Power Factor (total)
Return Air Temperature
Return Air Humidity
Return Air Enthalpy
Supply Air Temperature
Supply Air Humidity
Supply Air Enthalpy
Total Capacity (BTU's)
Wet Bulb Return

Business Case Study

Retailer HVAC project on 25 Stores

Each site had an average of 220 tons of HVAC with an average efficiency loss of 28%. The site was treated with a nanotechnology product that improved efficiency by over 20% yielding over 11,000 kWh savings per month.

- 11,000 kWh/month is 132,000 annual kWh's
- 132,000 kWh's at .94 lbs. of carbon emissions per kWh is 124,080 lbs. of carbon emissions avoided
- 124,080 lbs. is equal to 56.4 metric tons of carbon per store
- 56.4 metric tons x 25 stores equals 1410 metric tons of carbon offsets
- 1410 metric tons of carbon offsets per year over 6 years is 8460 metric tons of carbon avoided for the project
- 8460 metric tons at current carbon offset prices (\$52/ton) is a program value of \$439,920 in carbon offsets in addition to the electricity cost savings

As the global demand increases for purchasing carbon offsets, the cost of carbon offsets will continue to rise which will increase the amount of revenue potential of the project which will provide more revenue to reduce or eliminate the cost of funding the project.

Conclusion

There is an opportunity in the carbon market to quantify carbon savings and create value that has not been possible before. Mission 6 offers a complete platform including standards-based validation, state of the art technology and block chain provenance.

The Mission 6 ecosystem redirects crypto mining resources to sustainability projects, quantifies, validates and certifies avoided carbon emissions.

This provides a profitable sustainability model that creates broad-based participation opportunities with corporations and ESG investors. Mission 6 provides an evolved model for carbon quantification and trading using cryptocurrency.