WHITE PAPER

FREQUENCY

FREQUENCY CHAIN

A SUBJECTIVE APPROACH ON A NEW ARCHITECTURE FOR GREEN BLOCKCHAIN

(V 1.0)

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ABSTRACT

The current techniques, technologies, and systems which are purchased for energy trading operation management in Global renewable energy industries that fail in offering immutability, operational transparency, trusted data, and traceability origin features. These are vulnerable and centralized to a specific malfunction problem and less trustworthy because adversaries have data deletion and modification susceptibility.

In this whitepaper document, Frequency Chain presents the prospective advantages of crypto and blockchain technology for energy trading operation management within the Renewable Energy Industry because it provides immutability, audit, data traceability, confidentiality, security, and transparency in a completely decentralized manner.

Frequency chains identify and investigate the essential prerequisites for successfully using Green blockchain technology to protect the trading operations within the Energy sectors. Finally, we have detailed a discussion of the new possibilities of blockchain technology to protect the operation of energy transactions with industry specific.

Described many blockchain-based case studies and research projects to demonstrate practical applications of blockchain technology in the Renewable energy industry. Finally, we will identify and explain the gaping barriers to meeting the needs of electric vehicle energy trading applications.

CONTENT

1. Introduction

The Environmental problems that our plant faces today can all be traced back to industrialization, since the time 1950s when the “Great acceleration” of global economic activities started rolling. Even though the great acceleration brought forth very productive human progress and prosperity, it brought forth also some serious consequences.The major issues such as Global Warming and Climate change that the world is facing today are the direct results of the great acceleration. The unsafe levels of air pollution, depletion of forestry, fishing and freshwater stocks, toxins in rivers and soils, overflowing levels of waste on land and in oceans, and loss of biodiversity and habitats are all examples of the unintended consequences of industrialization on our global environmental commons.

The great acceleration was followed by the consecutive waves of revolutions in computerization, information technology, Internet and global supply chain Industries. It can clearly be seen now the convergence of digital, physical and biological realms are happening very fast. Emerging technologies, including the Internet of Things (IoT), virtual reality and artificial intelligence (AI), are enabling societal shifts as they seismically affect economies, values, identities and possibilities for future generations.

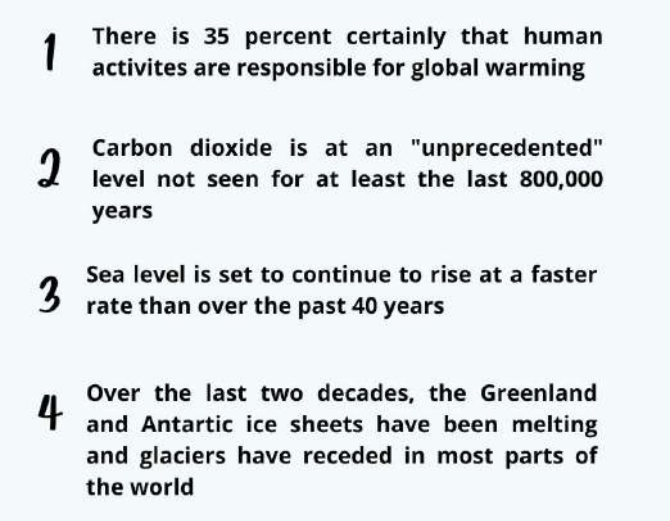
The present generation has given the world a unique opportunity to harness the Fourth Industrial Revolution (4IR) – and the societal changes it triggers along with it – to help address environmental issues and transform how we manage our shared global habitat. If we don’t take it seriously and leave that unchecked, this Fourth Industrial Revolution would have further brought forth unintended negative consequences on our Global Climatic equilibrium.

In the shadow of the high energy consumption of the Block chain, the issue for a more sustainable business model and other Proof-of-Work block chains is once more on the table. Given the fact that the technologies underpinning crypto are powered by electricity—just like other electricity-powered technologies such as cloud computing, data storage & processing, social networks, and artificial intelligence, industries from across the global economy are beginning to de-carbonize their operations as a means to facilitate widespread, sustainable industry growth.

2. GLOBAL ISSUES

2.1. Global Warming of 1.5 ºC

Global greenhouse gas emissions associated with global warming at 1.5 ° C above pre-industrial levels in the context of strengthening global response to climate change threats, sustainable development and poverty eradication efforts IPCC Special Report on the Impact of Routes.



2.2. Paris Climate Agreement

The Paris Agreement is a legally binding international agreement on climate change. Accepted at 196 parties in Paris. Its release is intended to limit global warming to less than 2 degrees Celsius, preferably 1.5 degrees Celsius.

Countries are striving to reach the global peak of greenhouse gases in order to reach this long-term temperature target.

The Paris Climate is a milestone in the multilateral climate change process as all countries move forward to embark on ambitious efforts to tackle climate change.

2.3. Carbon Emission

Greenhouse gases generate heat and warm the earth. The rapid increase in greenhouse gases is due to human activity. For the past 150 years, these gases have had a serious impact on the atmosphere. The largest source of greenhouse gas emissions from human activity is the burning of fossil fuels, heat, electricity and transportation.Carbon emissions are a method of measuring CO2 emissions in all industries. Currently, there are many challenges related to the business model of the carbon emission market. First, the government examines each consumer's carbon emission quota. With so many publishers, the task is very large. Therefore, we need an automatic and intelligent system.

Second, the government needs to track the emission quotas provided by each emitter to ensure reliability. Daily transactions make tracing a complex part. Therefore, you need to make sure that your carbon quota is irreversible and traceable.In any case, blockchain provides an intelligent and systematic platform for verifying CO2 emission credits for measures. Building a platform for trading and verification of CO2 emission allowances is worthwhile. It provides each issuer with a digital ID recorded on the blockchain. The greenhouse gas emission status of each emitter is updated in real-time on the blockchain.

2.3.1. Major Factors – Pollution cause

The rising number of pollutant sources has made breathing next to impossible. This has left everyone worried for their health. And, this has made us more curious about the sources of increasing the pollution level. So, it's, we first need to look at the basic details of air pollution to understand the causes of air pollution.

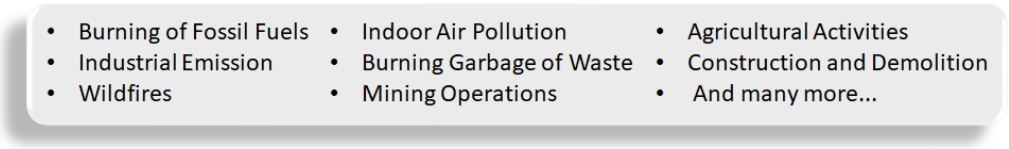


FIG 1: MAJOR FACTORS - POLLUTION CAUSE

2.3.2. Prime Factors – Pollution cause

Industrial

The progress of the industries is one of the biggest causes of industrial pollution. Humans have evolved in this since the 21st century. Technology is evolving rapidly and science is advancing day by day. This has brought the era of manufacturing into the limelight. With all this, our planet is surrounded by another impact, industrial pollution.

The industry was once a small business that emits smoke as a major source of pollutants. However, the strength of the factory is limited and it only operates at certain times of the day. This also reduces pollution levels. However, when these factories become full-scale production units, the problem of industrial pollution becomes even more serious.

Transportation

In recent years, air pollution worldwide has increased so much that the World Health Organization (WHO) has declared it "unsafe" for everyone. The automotive and transportation industry is estimated to release about 28% of carbon dioxide (CO2) and other harmful greenhouse gases into the atmosphere.

Road traffic is considered to be the largest producer of carbon dioxide. It accounts for about 70% of CO2 emissions in the transportation sector. Therefore, using electric vehicles as the primary transportation service for building low carbon transportation systems with zero emissions can be harmful.

Many countries are beginning to work on projects to address the global warming problem by developing electric and hybrid vehicles on a large scale. However, due to the large-scale development of electric vehicles, overloading the grid station is always a risk. This will increase demand for energy trading policies and efficient grid integration of vehicles.

2.4. GLOBAL ELECTRICITY DEMAND

"Access to ENERGY is essential to reduce poverty. Energy makes possible the investments, Innovations and new industries that are the engines of Job creation, inclusive growth and shared prosperity for the entire global economies" (WORLD BANK 2020)

Since it first started lighting homes in the late 1800s, electricity has provided the means to boost economic productivity and improve the human condition with modern conveniences like electric motors, air conditioning and refrigeration. Power generation has witnessed transitions in fuel sources from coal to nuclear and gas, and now we are harnessing wind and solar energy. The demand for electricity is expected to grow around the globe, supplied primarily by growth in wind, solar, natural gas-fired generation and nuclear.Besides meeting residential, commercial, and industrial demand, the increase in electricity demand is also fueled by the growth of electric vehicles in light-duty transportation.

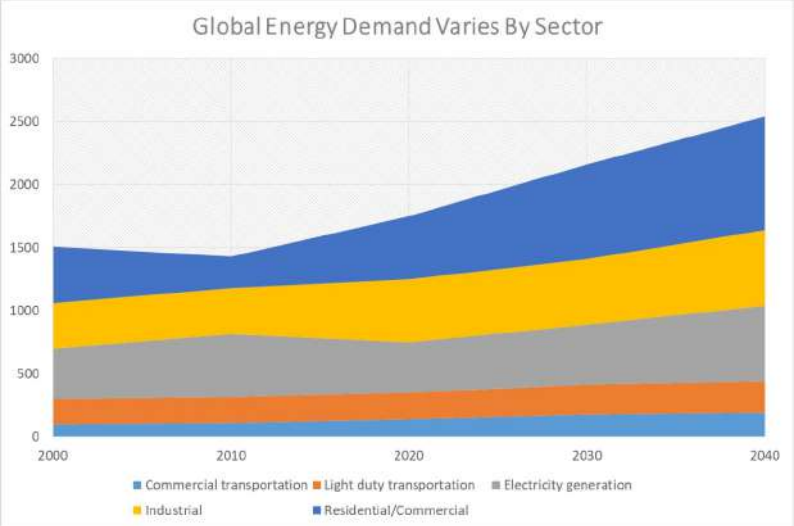


CHART 1 : GLOBAL ENERGY DEMAND BY SECTOR

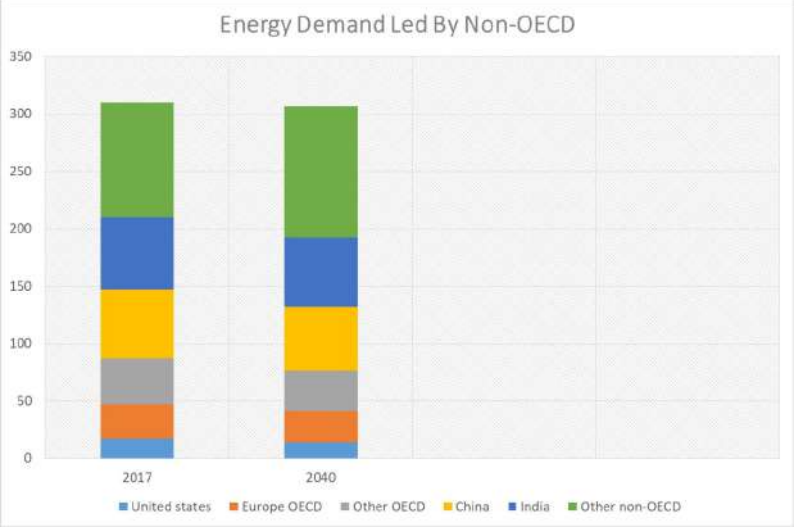


CHART 2 : ENERGY DEMAND LED BY NON-OECD

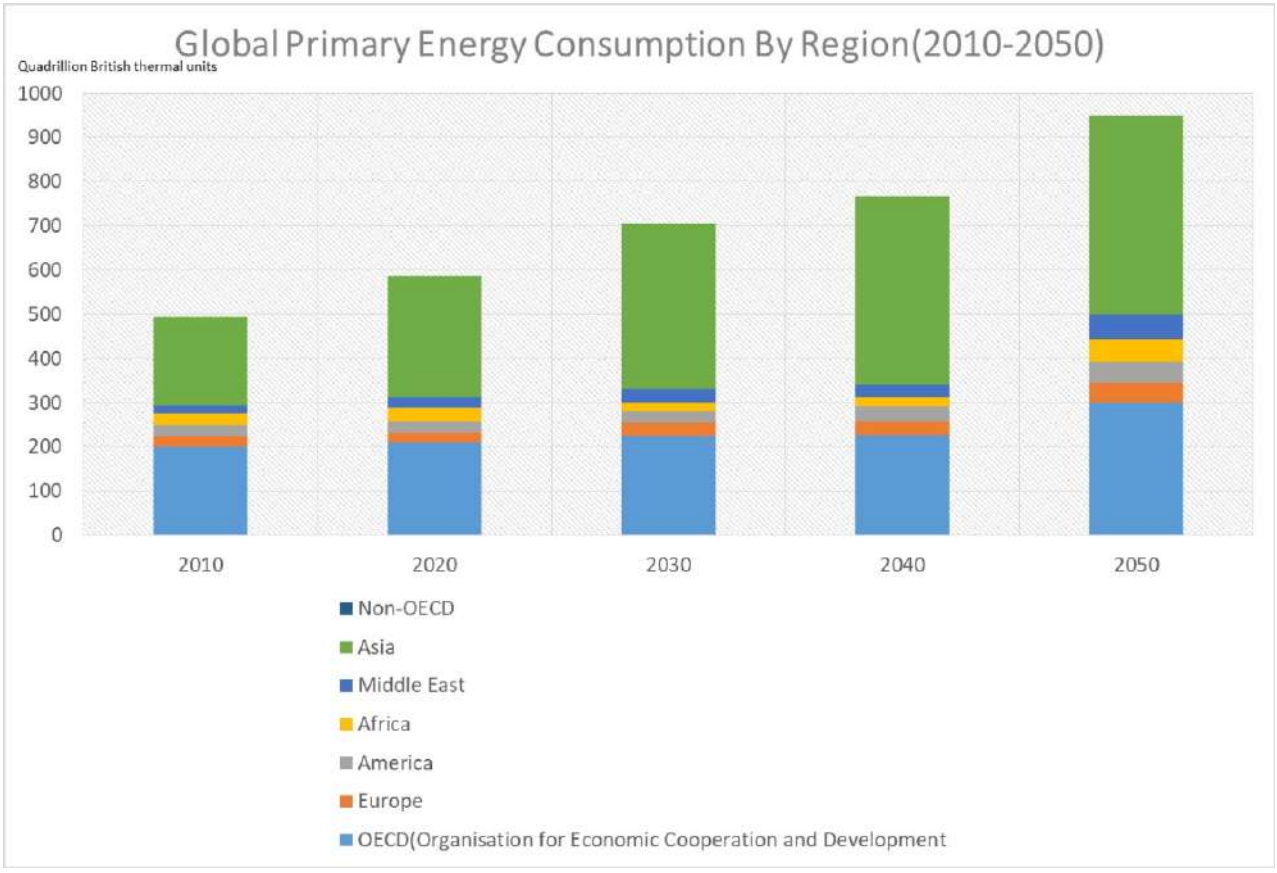


CHART 3 : GLOBAL PRIMARY ENERGY CONSUMPTION BY REGION (2010-2050)

Residential and commercial energy demand is flat out to 2040 as efficiency improvements offset the energy needs of a growing population.

Electricity generation is the largest and fastest-growing sector, primarily reflecting expanding access to reliable electricity in developing countries.

Industrial sector growth supports construction of buildings and infrastructure, and manufacturing of a variety of products to meet the needs of the world's population.

Commercial transportation grows with expanding economies, which increase the movement of goods. Personal mobility also expands, but efficiency improvements and more electric vehicles offset the increase in vehicle miles traveled.

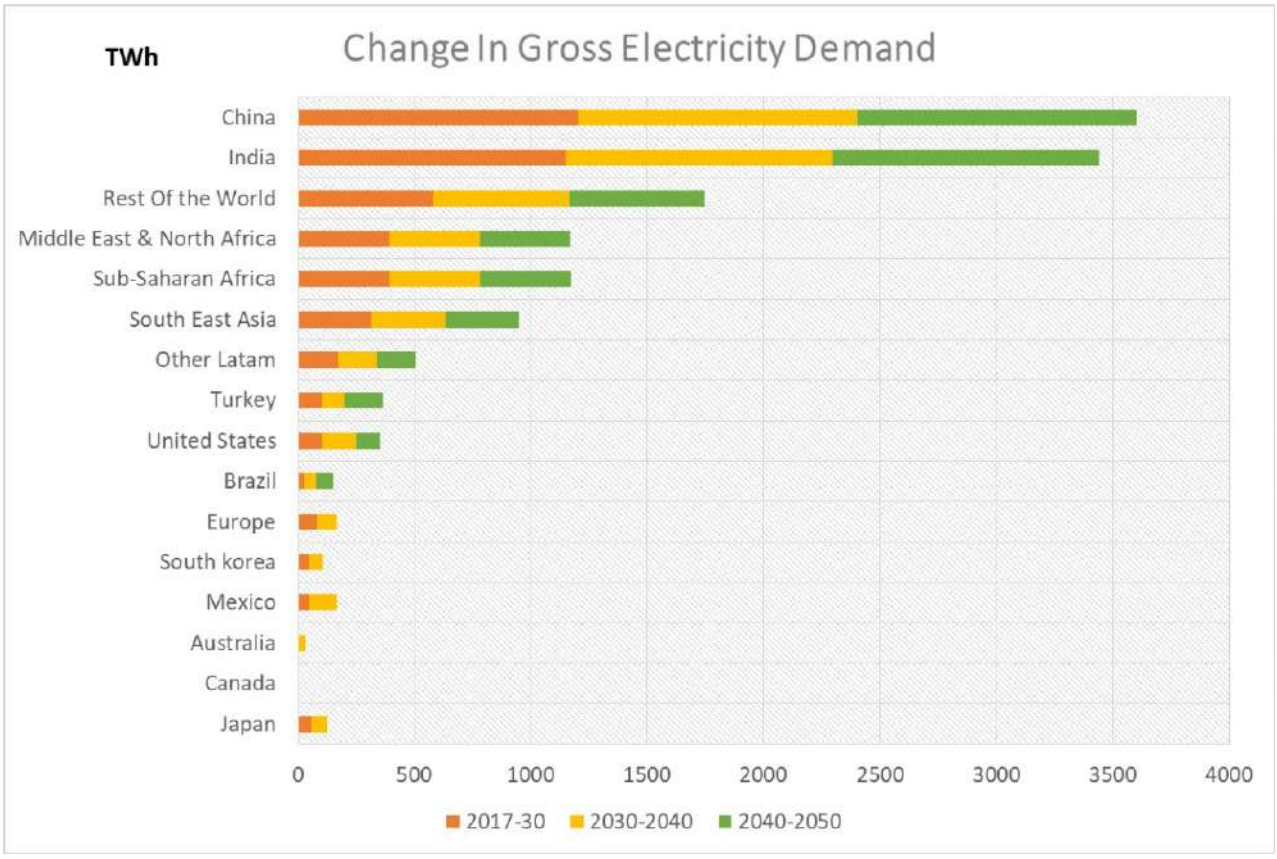


CHART 4 : CHANGE IN GROSS ELECTRICITY DEMAND

•Much of the world continues to shift further to lower-carbon sources for electricity generation, led by wind and solar, natural gas and nuclear, based on local opportunities and policies

•The share of electricity use into transportation is small today, but is expected to grow with increasing penetration of electric vehicles as a result of emissions/fuel economy targets and cheaper batteries

•Global Energy Consumption continues to shift proportionally to developing economies where population and economic growth are both faster than the global average.

3. BLOCKCHAIN

The blockchain is a global distributed ledger, which facilitates the movement of assets across the world in seconds, with only a minimal transaction fee. These assets can be any type of value, as long as they can be represented digitally. Up until Bitcoin and its distributed ledger was invented, digital currencies were seen as unfeasible due to the relative ease of which digital information can be copied. This is known as the “double-spend” problem where each transaction carries a risk of the holder sending a copy of the digital coin to the merchant while retaining the original. The traditional way of mitigating this risk has been to have a trusted third party, such as a bank, to act as a centralized authority keeping track of all transactions. Bitcoin has shifted this responsibility to a whole network. To exchange ownership of a digital coin, a centralized database is no longer required. Instead, a distributed ledger keeps a history of all transactions, and requires validation from its users to verify each change of ownership.

“Blockchain can bring the experience of a continuously connected, seamless, multi-device computing layer, with an overlay for payments —not just basic payments, but micropayments, decentralized exchange, token earning, digital asset invocation and transfer, and smart contract issuance and execution — as the economic layer that the Web never had.” - Melanie Swan

3.1 Blockchain today

Blockchain is at an inflection point, with momentum shifting from “blockchain tourism” and exploration to the building of practical business applications. This is particularly true among “digital enterprise” organizations [see enterprise vs. “emerging disruptors”], rather than in more traditional enterprises that are still working on how to incorporate digital into their existing operations and protocols. While our survey shows that these “enterprise digital” organizations may be lagging their fully digital brethren in this endeavor, the fact is, traditional enterprises are putting more resources behind blockchain than they had been in an effort to achieve greater efficiency and to develop new business models and revenue sources. Despite enterprise digital respondents’ interest in blockchains capabilities, nearly 39 percent of the broad global sample said they believe blockchain is “over-hyped.” In the United States, this number is higher: 44 percent of respondents view blockchain as over-hyped, up from 34 percent in a 2016 survey by Deloitte. This perception may be driven by the steep increase in token values over the last 18 months, and survey members conflating blockchain with the incentive layer of public blockchains, namely tokens.

On their own, these numbers seem to indicate that blockchain is moving in the wrong direction. However, we believe this change in attitude is more reflective of the shift toward the pragmatists in the blockchain community. Because we are still early in blockchain's development, these fits and starts in its maturation are not surprising. While executives in the financial services sector, for example, are leading the way in using blockchain to re-examine processes and functions that have remained static for decades, their counterparts in other sectors remain more reserved as they work to develop appropriate use cases for blockchain. At the same time, there are a growing number of emerging disruptors across each sector, challenging traditional business models with the use of blockchain

3.2. Blockchain Network's Power Demand

What is the link between electricity consumption and carbon emissions?

It is essential to distinguish between electricity consumption and environmental footprint. The first concerns the total amount of electricity used by the Bitcoin mining process. The latter concerns the environmental implications of Bitcoin mining. What ultimately matters for the environment is not the level of electricity consumption per se, but the carbon intensity of the energy sources used to generate that electricity.

For instance, one kilowatt-hour (kWh) of electricity generated by a coal-fired power station has a substantially worse environmental footprint than one kWh of electricity produced by a wind farm. As a result, rising (or falling) power demand does not automatically lead to a proportional increase (or decrease) in carbon dioxide and other greenhouse gas emissions.

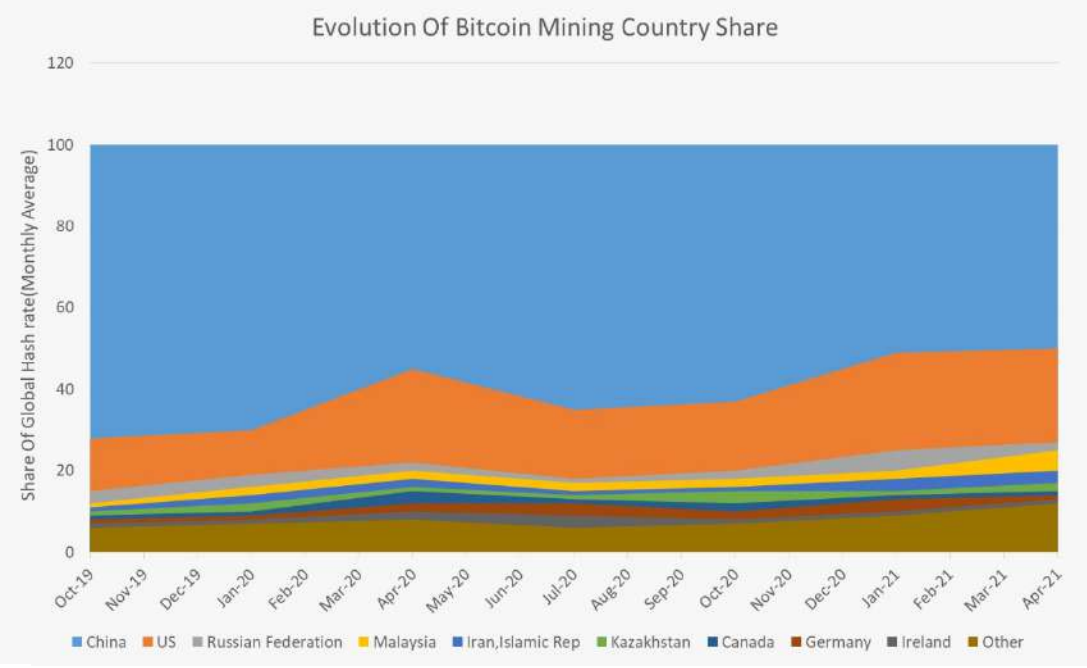


CHART 5 : EVOLUTION OF BITCOIN MINING COUNTRY SHARE

Cambridge University's Bitcoin Electricity Consumption Index (CBECI)

Disclaimer by CBECI : LIMITED DATA AVAILABILITY ….It is surprisingly challenging to find reliable electricity figures about the energy footprint of many industrial and residential activities. Datasets are often non-standardised, produced or maintained by various stakeholders who pursue different interests, based on distinctive theoretical models that use widely differing methodologies and assumptions, and/or limited to a specific geographic area or time period. This leads to conflicting estimates about the same activity that can stand in stark contrast to each other.

CBECI has considered the Blockchain transactions' share of the world's total yearly electricity production and consumption:

Blockchain Network Power Demand

FIG 2 : BLOCKCHAIN NETWORK'S POWER DEMAND

Total Bitcoin Electricity Consumption

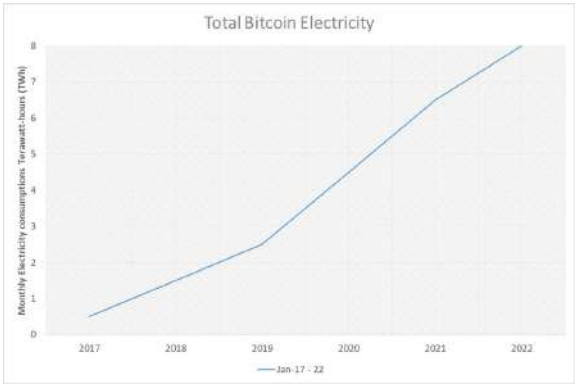


CHART 6 : TOTAL BITCOIN ELECTRICITY CONSUMPTION

Bitcoin and Ethereum PoW energy consumption compared to Ethereum PoS

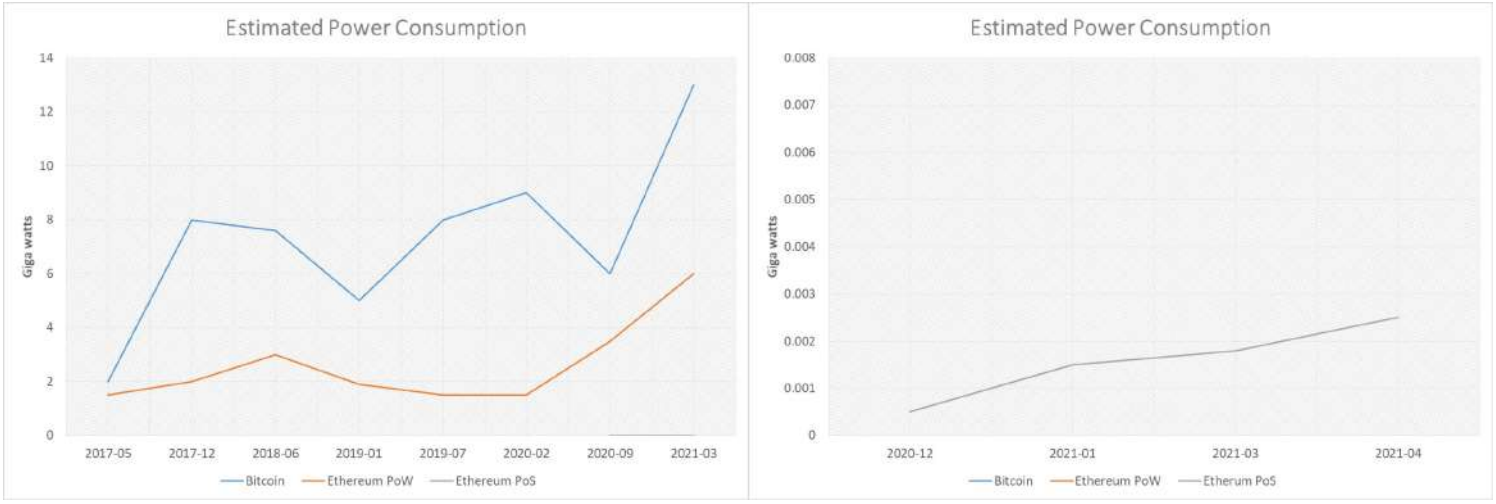


CHART 7 : Bitcoin and Ethereum PoW energy consumption compared to Ethereum PoS

3.3. HOW GREEN IS THE BLOCKCHAIN?

When talking about blockchain technology in academia, business, and society, frequently generalizations are still heard about its – supposedly inherent – enormous energy consumption. This perception inevitably raises concerns about the further adoption of blockchain technology, a fact that inhibits rapid uptake of what is widely considered to be a ground-breaking and disruptive innovation.

Blockchain's energy consumption currently receives a lot of criticisms as the international cry for Global Warming reduction call has finally got its due attention. Even though high energy consumption is not intrinsic to blockchain technology in general, it is however, almost exclusively inherent to the mining nodes in the network due to its architectural and governance design choices.

Proof-of-Work (PoW) is the consensus mechanism in Blockchain technology This PoW network is run by validators, so-called miners, who add new blocks of transactions to the network on an ongoing basis. The PoW miners compete for the incentives by adding computational power to the network; the more computational power, the higher the chance electricity requirement. Specialized PoW mining hardware devices generate computational power, which consume vast amounts of electric energy in the process.

PoW takes a bunch of transactions in a random order:

```
Mike -> Jack = 5 BTC
Jack -> Charlie = 3 BTC
```

- It hashes them - into a string of letters and numbers, like this

SHA256 Hash of your string: [Copy to clipboard]

810AE83A272AFCF4CC28AE656D9F851ED14D6B8CCDCF3022723A25D3DBE5DEA4

- Until the Hash validates, the miner adds some nonce to the transactions:

FIG 3 : HASH & NONCE

3.3.1. What Energy sources are Blockchain miners using?

Bitcoin miners are found all around the world, and consequently use a broad variety of power sources. Our 2020 industry survey found that hydroelectric power, coal, and natural gas were dominating, but that miners were also using oil, nuclear power, and renewables (wind, solar, and geothermal) as part of their energy mix.1
Miners can receive electricity from the local grid, which is often powered by a varying composition of energy sources. Miners may also be directly connected to local power stations (off-grid mining), which are generally powered by a single energy source.

3.4. How Sustainable is Blockchain's power mix?

Although energy source disclosures are becoming more common among hashing facilities, the exact energy mix of the Bitcoin mining industry remains unknown. Several studies have shown that a growing share of total electricity consumption originates from renewable energy sources such as hydro, solar, or wind power. However, estimates diverge considerably, ranging from approximately 20%–30% of the total energy mix to more than 70%.

A possible explanation for these discrepancies – aside from methodological differences – can be found in the dynamic nature of Bitcoin mining, which causes the power mix to fluctuate throughout the year. Thanks to the relative mobility of mining equipment, hashing facilities can be set up in a comparatively short time elsewhere. This has led to some miners favouring off-grid electricity deals with power stations in remote areas for which little or no data is available. Furthermore, seasonal migrations between regions with different energy profiles have been observed in some countries; most notably in China where miners have flocked from the coal-rich Northern Province of Xinjiang to the South-Western Province of Sichuan to benefit from cheap surplus hydro power during the monsoon season. Estimates that lack a time dimension are unable to capture these subtleties. All they can provide is a partial insight based on a single snapshot at one specific point in time. Since Bitcoin's power mix is not static, a proper environmental assessment of Bitcoin mining requires continuous tracking and analysis. As the mining market is undergoing significant changes following the Chinese government crackdown in June 2021, more research and data is needed to assess how the global redistribution of hash rate affects the energy mix and carbon intensity of the network. Our team is currently exploring the development of a carbon emissions model that, based on dynamic geo locational data from the mining map, attempts to track Bitcoin's environmental footprint over time.

3.4.1. Is Blockchain mining an environmental disaster?

This question has undoubtedly sparked a lot of heated debate since Bitcoin has come under public scrutiny for its enormous energy consumption on par with that of whole nations. The energy mix plays a vital role in finding a conclusive answer to this question. Until additional and better data on the network's power mix become available, strong assertions on either side of the debate should be considered with caution.

A radical thought experiment can provide an alternative perspective on this question. What would be Bitcoin's environmental footprint assuming the absolute worst case? For this experiment, let's use the annualised power consumption estimate from CBECI as of July 13th, 2021, which corresponds to roughly 70 TWh. Let's also assume that all this energy comes exclusively from coal (the most-polluting fossil fuel) and is generated in one of the world's least efficient coal-fired power plants (the now-decommissioned Hazelwood Power Station in Victoria, Australia). In this worst-case scenario, the Bitcoin network would be responsible for about 111 Mt (million metric tons) of carbon dioxide emissions1, accounting for roughly 0.35% of the world's total yearly emissions.

It should be noted that this calculation does not include the carbon footprint of the entire hardware supply chain from production to delivery, nor the generated e-waste from the disposal of older models.

3.4.2. Do Blockchain miners seek out renewable energy sources?

Miners are economic actors that want to maximize their profits. As 'energy nomads', they seek cheap and stable power irrespective of location or underlying power source. This tends to overlap in some regions with certain renewable energy sources where seasonal surplus capacity cannot be absorbed, leading to attractive electricity rates not matched elsewhere. An example is the recorded migration of Chinese miners to provinces in the Southern West where hydro-power is abundant – and thus very cheap – in summer. However, when electricity prices rise due to dropping water levels, these miners move North to coal-fired regions like Xinjiang that now offer better rates.

Intensifying discussions around Bitcoin's sustainability are likely to cause a change in mindset, though. The growing institutional focus on ESG (Environmental, Social, and Governance) considerations has already led some publicly traded mining companies to actively incorporate sustainability goals into their business model. In the future, the pursuit of a 'net-zero' emissions strategy may well turn into a competitive advantage as the world is moving towards decarbonisation. In either case, operations will continue to be dictated by economic rather than ideological or environmental principles.

3.4.3. Does Blockchain mining incentivize the deployment of renewable power generation?

Some have suggested that Bitcoin miners could help stabilise energy grids that struggle with the intermittent nature of renewables. During times of abundant generation, miners can absorb excess capacity that the grid could not handle otherwise. In turn, they halt operations on-demand when the grid runs short. As a result, grids could manage load more effectively, which should incentivise the deployment of additional renewables-based power generation capacity.

However, the same argument can also be made for carbon-based generation: by creating new demand for stable and abundant power – which renewables cannot easily provide on their own, miners extend the economic lifetime of old power plants that run on fossil fuels such as coal or natural gas. In some regions, this has already led to power plants that were decommissioned for the lack of profitability to be reinstated again.

3.4.4. Are there initiatives to make Blockchain greener?

More recently, a number of privately-formed initiatives have emerged in the Bitcoin ecosystem to address rising sustainability concerns. Some focus on bringing more transparency to the mining industry through new data and insights. Others introduce commitments for mining members to actively decarbonise by a future date.

Many publicly listed mining firms have already acted as trailblazers by disclosing information about facilities, power mixes, and sustainability efforts. Some non-mining Bitcoin firms such as asset managers and exchanges have already begun offsetting their emissions via carbon credits. These combined efforts have led to a broader environmental awareness among the industry, nudging mining firms to review their energy sourcing strategies more carefully and take steps to reduce their carbon footprint.

The largest push for decarbonisation may, however, ultimately come from the investor side. Institutional investors and service providers are increasingly bound by stringent ESG rules and requirements. This raises questions about whether Bitcoin can be considered a compliant investment, which determines future inflows of funds into the ecosystem.

Some have suggested that these considerations represent a potentially existential threat for miners, thereby creating a natural financial incentive for the industry to actively decarbonise. Others are doubting the effectiveness of a purely market-driven approach and call for additional policy responses.

4. THAI GREEN POWER SOLUTION COMPANY LIMITED

In accordance with the United Nations' declaration the companies world over has committed themselves to more ambitious climate targets aligned with limiting global temperature rise to 1.5°C above pre-industrial levels and reaching net-zero emissions by no later than 2050.

THAI GREEN POWER SOLUTION
COMPANY LIMITED

Climate leadership has never been more important than it is right now.Thai Green Power solutions Co Ltd (TGPS) are already proving that 1.5°C-compliant climate target is possible and achievable. TGPS, positioned itself well to seize this opportunity at the forefront of this movement and contribute to the achievement of the Sustainable Development Goals.

Building a prosperous, net-zero carbon economy by 2050 requires both business leadership and ambitious Government policies. Our Nation, has aimed to step up its climate change ambition by increasing its Nationally Determined Contribution (NDC) to 40 per cent, and aims to reach the Net Zero Emissions in 2050.

By setting policies and targets in line with a 1.5°C trajectory, our government has given the businesses the clarity and confidence to move ahead divisively in achieving net zero-carbon economy.
Thai Green Power Solution Co Ltd has been established in the year 2022, with a futuristic Vision of building a Greener Thailand where the future Thai generation to have their rightful place to live and thrive in a Carbon Free environment. We have embarked this patriotic journey with a strategic goal of providing a self-sufficiency in our nation's Power consumption without bringing any harm to the atmosphere.

Our goal is to achieve a Greener Tomorrow encompassing the International Community's vision of reducing the Global Warming to the prescribed level for a greater cause of Better World on the basis of UN Declaration. In this auspicious journey, we, Thai Green Power Solution Co Ltd., would always have our Nation's growth as a prime factor through which the Company would strive to enhance its Global responsibilities.

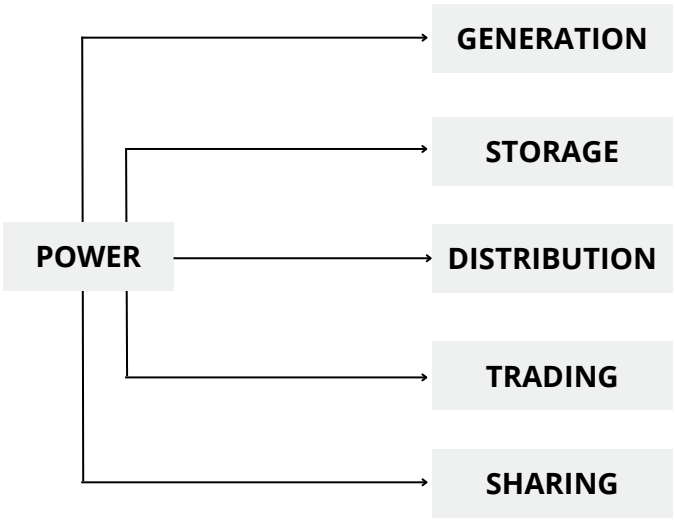
4.1. TGPS | Solar Energy

Solar power is one of the most efficient, renewable and inexhaustible resources that the planet has, but it's only been in recent years that humans have been able to harvest most effectively for our power grids. The solar industry has seen rapid growth over the past decade, and a major contributing factor has been the surge in solar farms popping up across the globe.

TGPS works remarkably in integrating Blockchain technology into the energy sector, improve services and increase economic, environmental and social benefits. This is a truly big opportunity in the energy market with the potential to reward all participants; the consumer with lower costs and cleaner energy, producers with better compensation for the electricity they produce and contribute towards the growth of the network to face the "Global Electricity Demand".

4.2. TGPS – BUSINESS MODEL | TECHNOLOGY | PROJECTS

BUSINESS MODEL



TECHNOLOGY

- **TGPS POWER TRADING PLATFORM - FreC EnEx**
- **GLOBAL POWER SHARING - FreC GPS**
- **DE-CENTRALIZED APPS - FreC DAPPS**
- **DE-CENTRALIZED E-COM - REDE E-COM**
- **DE-CENTRALIZED PAYMENT - Fpay**

PROJECTS

- **SOLAR POWER PLANT**
- **COMMUNITY GRID**
- **POWER TELLER MACHINE - PTM**
- **TGPS BATTERY SWAPPING**
- **TGPS MOBILE EV CHARGER**
- **TGPS PORTABLE EV CHARGER**
- **TGPS AEROPONICS**
- **TGPS COLD STORAGE**
- **LITHIUM ION BATTERY**
- **E-BIKE**
- **E-RIDE**

FREC EnEx : FREC ENERGY EXCHANGE
FREC REDE E-com : RENEWABLE ENERGY DECENTRALIZED E-com
F-PAY : FREC PAY (DECENTRALIZED DIGITAL PAYMENT)

4.3. TGPS | BLOCKCHAIN

Blockchain development and implementation are happening at a pace which is nearly to the speed of light when compared to the development of Internet which grew and spread all over at the speed of sound. The Internet technology helped us to change how to manage the information effectively and instantly.However, the blockchain technology helps us how to create and govern the VALUE behind everything in a fully transparent manner without anyone's influence to alter, control, monitor or hold such information. This nature of blockchain would fundamentally poise to transform our institutions and the economy.

The irresistible force of blockchain in driving entrepreneurship, fueling an innovation economy, and generating prosperity for all, TGPS has latched on to this technology in bringing out its own Blockchain that can address the shortfalls of many other chains already in prevalent usage. TGPS envisioned a block chain platform which is exclusively for the Global Renewable Energy Industry to ensure that at every stage of their process it is operated by renewable energy so that the industry has an opportunity to leverage the transparency of blockchains themselves to measure just how much entire networks are powered by renewable.

4.4 TGPS – TECHNOLOGY

When compared to a traditional network, blockchain technology is more capable and has improved network capacity. With decentralization built-in, it can be used to build a shared and distributed blockchain. TGPS has implemented all the technical & technology nuances integrated with blockchain in our three major business operations.

4.4.1 Cloud Storage:

The centralized environment of a Cloud concept had been vulnerable to security threats and hackers. The decentralized nature of blockchain broke those barriers and it is less likely to get exploited and will protect the data from being lost. This allows us to have a control over our data. The performance, reliability and transparency are the main factors which paved way for such a growth that our Dealers, Distributors & Customers are intact with our organization. Currently the blockchain based storage has turned out to be the best storage on the cloud for TGPS.

4.4.2 Internet of Things:

IoT, the Internet of Things, is certainly a ground breaking technology and it describes the network of physical objects— "things"—that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet.

These devices range from ordinary household objects to sophisticated industrial tools. Blockchain will be the basis of these interactions with its security, transparency and its smart contract codes. Through this TGPS operates our “Solar Farms/Plant, Electric Vehicle, E-Ride, Manufacturing units & so..., it is easy for our technical team & Franchisee to automate the whole network & operations.

4.4.3. Power management:

Nothing moves without Power. We are living in a world where we need the power to do almost everything. However, the Power that we consume and utilize all are coming through some or the other intermediates. They take a huge chunk of the profit to ensure to deliver their service. With the advent of blockchain, our entire business models of how the Power is produced, stored, distributed and billed will change and that transformation would bring the Power Bills down and affordable.

5. FREQUENCY CHAIN

We would call proof of work a great carbon emitter, there are carbon-controlled technology in blockchain which works based on renewable energy but the major pressing factor is “THE PROPER ACCOUNTABILITY”. Even if some of the nodes run on RENEWAL ENERGY they are not accounted and properly rewarded. Majorly don’t promote a greener future in their actual operation, rather only promoted through their applied operations.

With the tagline of **"Align the FREQUENCY by FREQUENCY"**, we've conceptualized "FREQUENCY CHAIN" an exclusive BLOCKCHAIN fully operated with renewable energy & will act as a first ever GREEN BLOCKCHAIN for the global renewable energy industry.

FREQUENCY CHAIN adopts "Proof-of-Stake" (PoS) which was specially invented to eliminate the massive energy costs of a Proof-of-Work network.

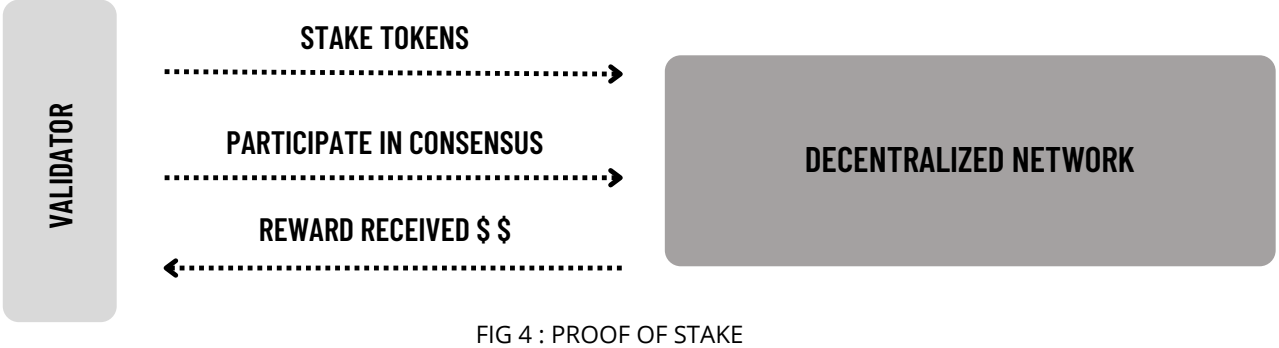


FIG 4 : PROOF OF STAKE

PoS is infinitely more efficient & opens the door to a wider array of techniques that use game-theoretic mechanism design in order to better discourage centralized cartels from forming. PoS network achieves scalability by establishing a consensus before blocks are constructed, which allows for the processing of thousands of requests per second with less than a millisecond latency spike. PoS blockchains, unlike PoW blockchains, do not limit who can propose blocks based on energy usage & acts as a great energy efficient mining blocks. Additionally, you don't need top-of-the-line technology to create new blocks. Proof-of-stake results in the network having more nodes. More nodes in a network help develop governance norms that provide a stronger immunity to centralization. In PoS systems, this is made possible by a higher degree of hardware independence. As a result, proof-of-stake is frequently seen as the consensus algorithm least likely to lead to network centralization.

5.1. FreC - "FREQUENCY" Renewable Energy CHAIN

Frequency Chain is a futuristic Blockchain mechanism for creating trusted data in the renewable energy industry business operation, literally a block of bridge between Power Generator (G) - Manufacturer (M) - Power Distributor (D) - Power Consumer (C) & FreC is its native Token. As an initiation FreC adopts ERC20 which is integrated with Polygon Mainnet.

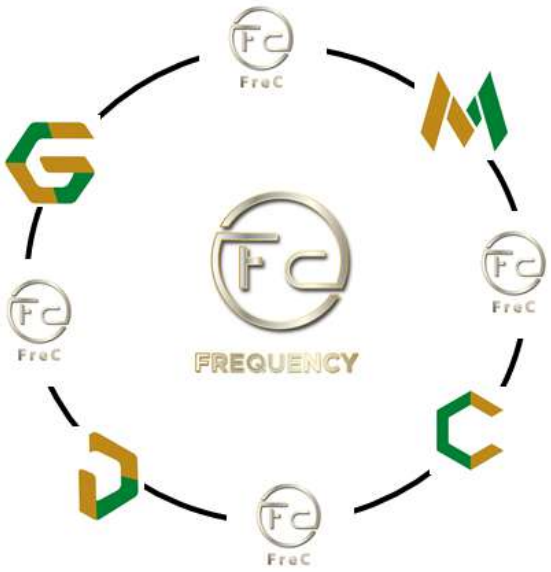


FIG 5 : BRIDGE BETWEEN GDC & MDC

5.1.1. FreC - Financial Infrastructure | TOKENOMICS

TOKEN NAME	FREQUENCY
TOKEN TICKER	FreC
INITIAL SUPPLY	125,000,000
MAXIMUM SUPPLY	420,000,000

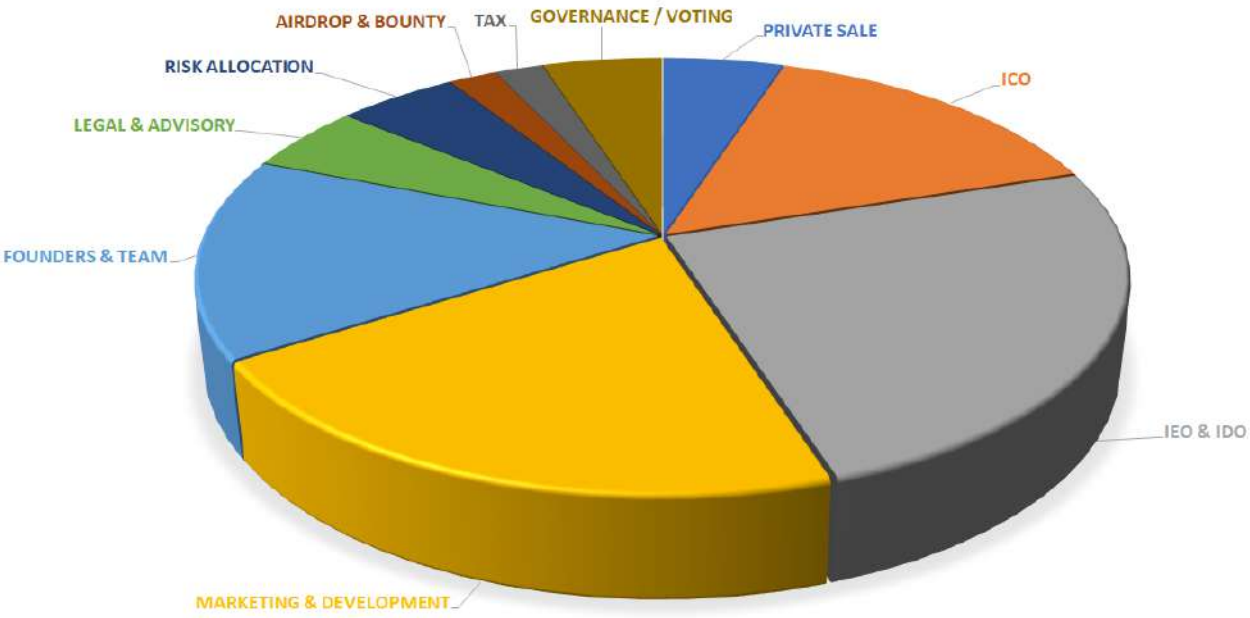


CHART 8 : TOKENOMICS

PRIVATE SALE	5 %
ICO	15 %
IEO & IDO	25 %
MARKETING & DEVELOPMENT	21 %
FOUNDERS & TEAM	15 %
LEGAL & ADVISORY	5 %
RISK ALLOCATION	5 %
AIRDROP & BOUNTY	2 %
TAX	2 %
GOVERNANCE / VOTING	5 %

5.1.2. Token Utility

The "FreC" token is the utility token of Frequency Chain and its used in the interoperable projects which will be our next-generation public green blockchain based solution for Global Renewable Industry. FreC powers the overall Renewable Energy Industry business operational Ecosystem through Frequency Chain with utility across payment, trading, business operation and financial use cases.

5.1.3. FreC - Utility Ecosystem

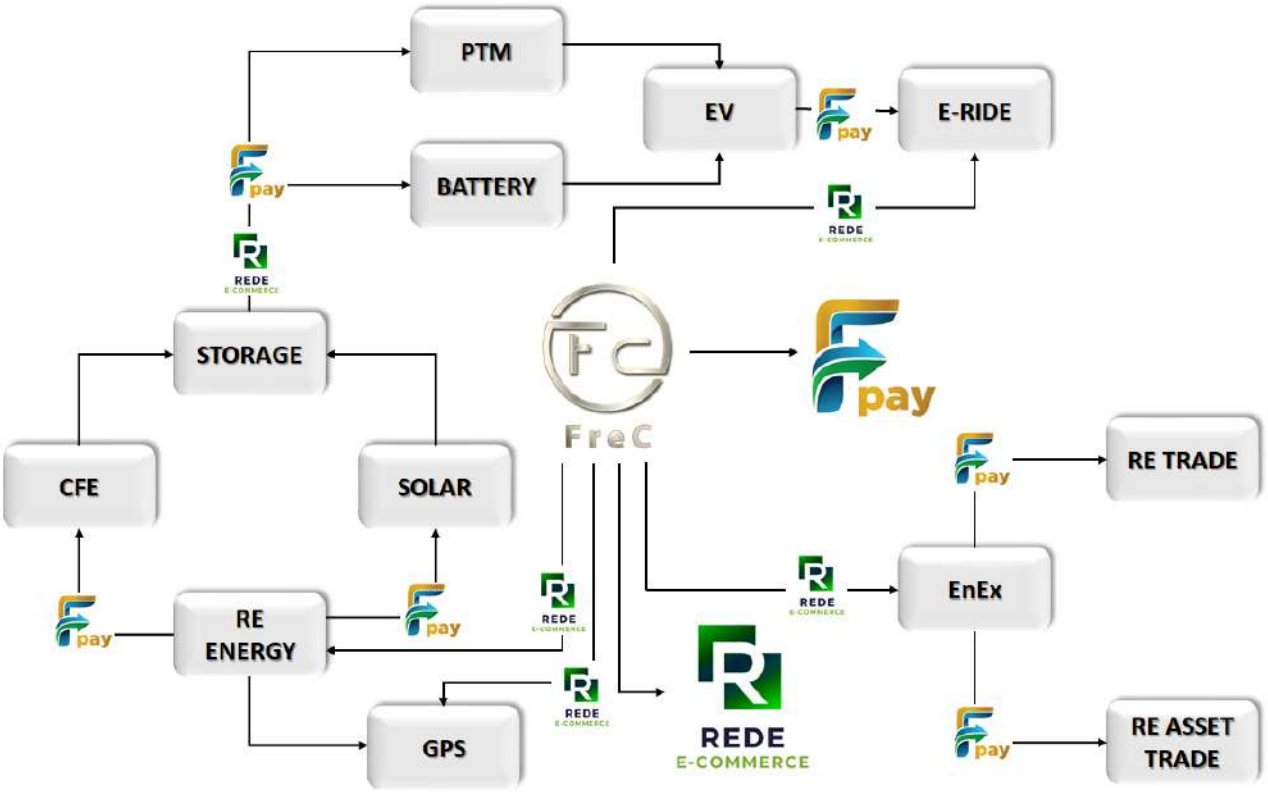


FIG 6 : FreC - UTILITY ECOSYSTEM

5.2. FREQUENCY CHAIN - D APPS

F-Pay - FreC Pay
FREE - FreC EV Mobility
REDE - E-Commerce Portal
FREDE - ERP
EnEx - De-Centralized Energy Exchange
FGPS - De-Centralized Power Sharing

TERMINOLOGY:

RE - Renewable Energy
EnEx - Energy Excgange
GPS - Global Power Sharing
CFE - Conventional Free Energy
PTM - Power Teller Machine
EV - Electric Vehicle
E-Ride - Electric Vehicle Ride

6. RENEWABLE ENERGY | ECONOMY | F-Pay

- The RE Manufacturer can raise the 100% GREEN Fund equivalent to his Assets in hand – tokenized Asset.
- The RE Manufacturer can introduce staking – Lending.
- The RE Manufacturer will be trustworthy & certified entity worthy of getting the Loan or Lending a Loan.

- The RE Power Generator / Products manufacturer, may bring out their own Green Tokens for their ICO Fund Raising or product utilization using Frequency Chain.
- Such newly created Tokens can be traded against FreC tokens.

- F-Pay will solely act as a Frequency Chain adopted de-centralized digital payment mode among the trading & transaction within the Renewable Energy Industry.
- F-Pay holds the potential to drive innovation and spur competition across the FreC ecosystems, with user consent and high consumer protection standards. In the RE industries where it has been implemented, will drive the creation of innovative products and services, which will enable more choice and better financial options for consumers and small businesses within the FreC Ecosystem.

- F-Pay places a strong emphasis on solutions that reduce friction, both for the **Generator (G) / Manufacturers (M), Distributors / Dealers (D) and Consumers (C)** that connects into FreC Ecosystem.
- F-Pay will be the bridge between GDC / MDC.

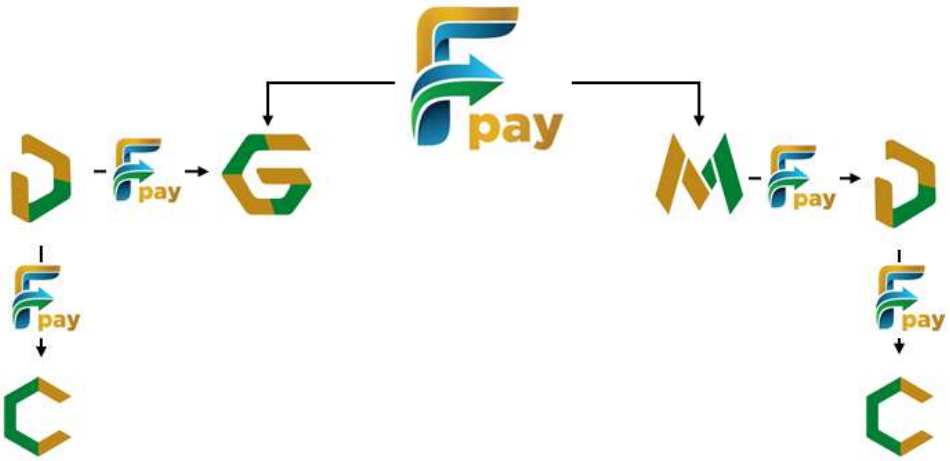


FIG 7 : Fpay - UTILITY ECOSYSTEM

7. RENEWABLE ENERGY | AUTHENTICITY | FreC

- Frequency Chain, through its RE Validating system, would never allow its users to issue any FAKE COINS/TOKENS for any Scams.
- The RE Power Generator (G), when implementing the Frequency Chain built ERP, will become a Certified Power supplier/provider as he cannot artificially boost up the Prices and bring volatility into the Energy market on his own.
- The Frequency Chain Mining Validator would run a Periodical Assessment on the project through dedicated Third-Party service provider, on Smart Contracts

8. RENEWABLE ENERGY | FUTURE | FreC

- The RE Power Generators, can bring out NFTs on Frequency Chain, of their Solar farms, EV Products and later on trade them on Metaverse.
- Frequency Chain would be running its own Power Trading Exchange, where all the RE Power Generators/sellers/purchasers can Trade their Power stocks and requirements.
- Frequency Chain would be running its own Digital Exchange, where preference would be offered to RE Companies, Green Tokens and other RE Echo systems allied companies
- Frequency chain can and will monitor all the RE Industry participants and together we will travel Towards NET ZERO / EMISSION FREE GREENER TOMORROW.

9. REDE | Frequency chain | RE De-Centralized E commerce Portal

REDE
E-COMMERCE

Frequency Chain' Ecosystem is structured in such a way that it makes the transactions safer and faster with less gas fees, hence the potential impact on e-commerce is tremendous. This will be the most common blockchain technologies used in RE Industry's e-commerce which also provides a platform for RE brands (G) to establish its business prosperity with the use of REDE which also allows RE customers (C) to make purchases in Frequency D apps that accept FreC / F-Pay as payment.

REDE makes online financial transactions more secure, hence Frequency Chain is a win-win for both brands (G) and buyers (C). But it also provides a lot of other benefits, including cutting costs, improving business processes, making transactions faster, and improving the overall customer experience with no third party interaction in the whole of its business ecosystem.

9.1. REDE Ecosystem

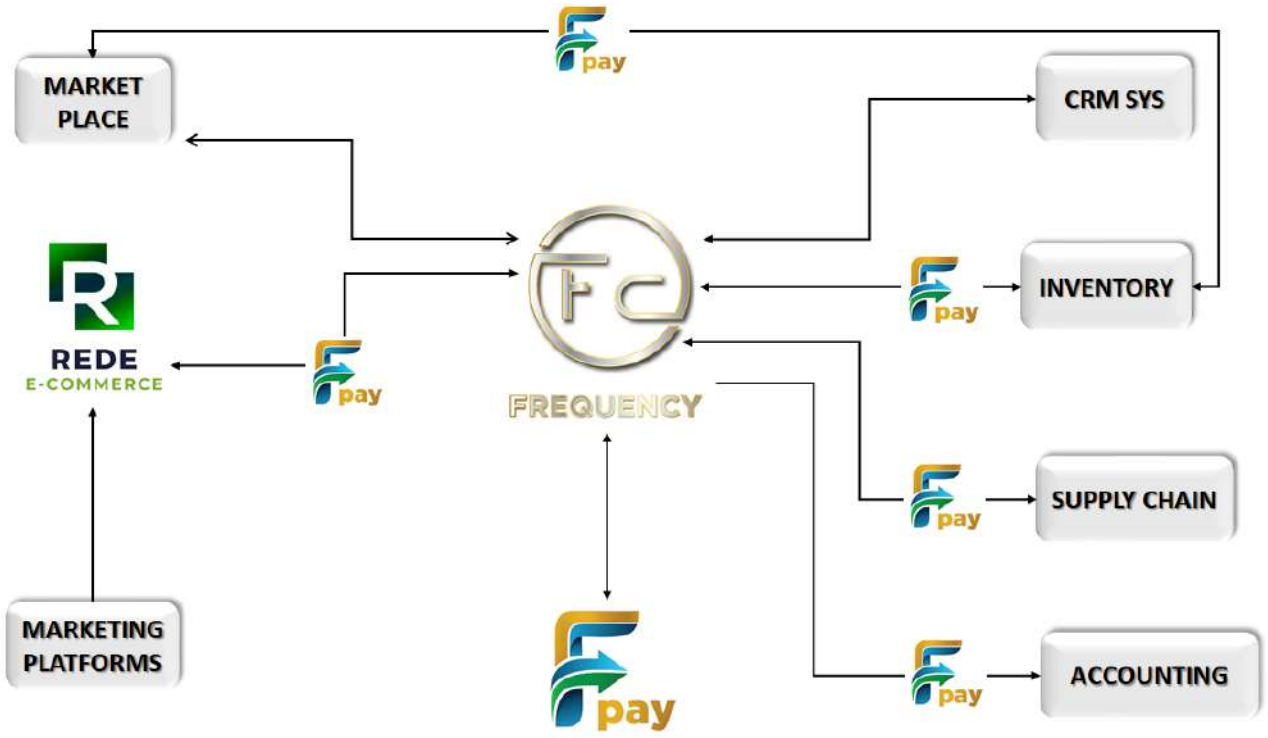


FIG 8 : REDE - ECOSYSTEM

- Data breaches and fraudulent transactions are major concerns for e-commerce retailers. Frequency Chain technology allows for trusted identities verified by multiple trusted parties, and offers the highest level of security for customer databases and CRM systems.

- One big advantage of Frequency Chain technology is that it allows retailers to combine services like payment processing, inventory management, product descriptions, etc. so that they spend less on buying and maintaining separate systems. And because FreC can be sent instantly peer-to-peer, there's no need to go through banking systems. This cuts down on fees charged by banks for issuing or acquiring funds, or fees charged by credit card companies to process payments. Only a very less Gas fees is applicable which will be much lesser compared to the tradition payment systems.

- Frequency Chain will store more than just transactional data. They can store smart contracts which can automate tasks based on preset rules. Reducing cost and complexity of supply chain management. Frequency Chain in e-commerce supply chain means brands can cut the paper and manual work associated with shipping. Bills of lading for cargo can be placed on the Frequency Chain at each stage of the supply chain, cutting down on administrative time/costs and making it easier to track shipments or verify product information and pallet weight. And for products with expiration dates or certificates of authenticity, our blockchain can ensure the validity and quality of inventory and reassure customers they're getting what they paid for.

10. FREDE | FREQUENCY CHAIN RENEWABLE ENERGY DE-CENTRALIZED ERP

The ERP software centralizes all business data, empowering businesses to fully control the inner processes and make informed choices for the future. In addition, all data is updated in real-time, which is crucial for the smooth functioning of all industry sectors. Constant communication between functions reduces the chance of severe errors, while immediate access makes identifying potential setbacks in the ongoing processes.

We create an ERP system to integrate with blockchain - Frequency Chain FREDE. Hence, RE companies have everything they demand, setting the perfect stipulations for business growth. Frequency Chain promotes the existing privileges of ERP system to a different level through FREDE.

10.1. FREDE ECOSYSTEM

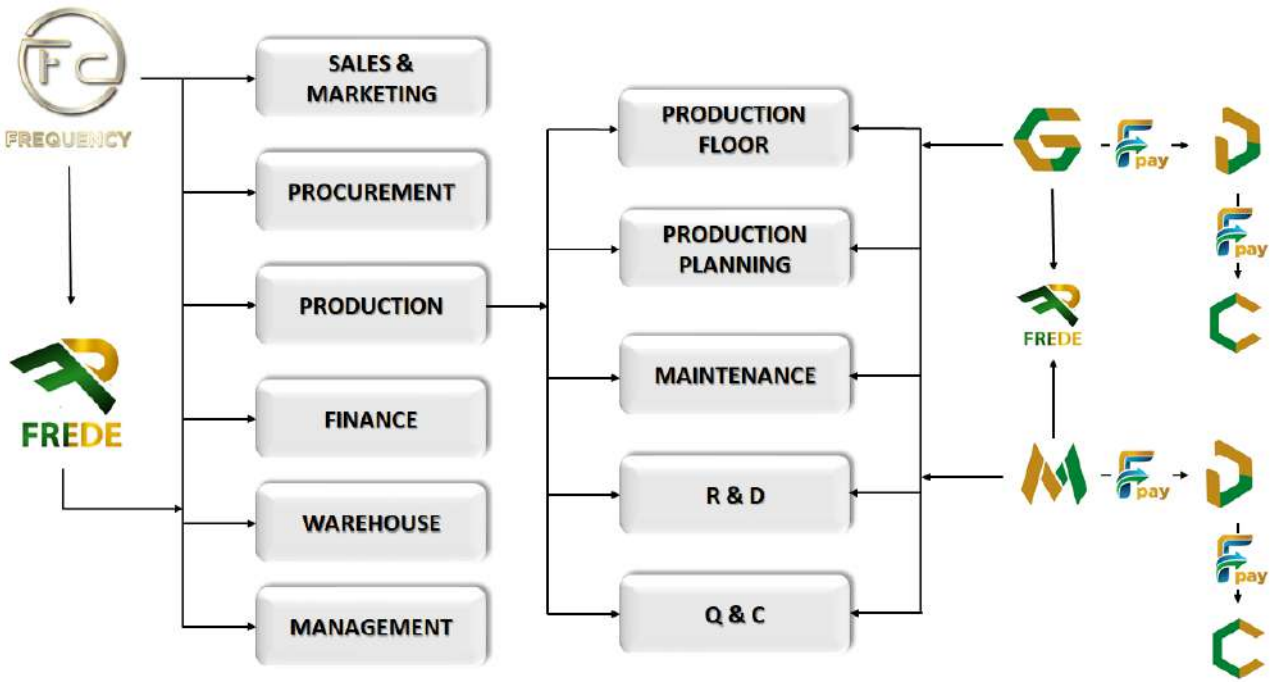


FIG 9 : FREDE ECOSYSTEM

- FREDE optimizes database administration framework; blockchain employs a real-time scalable database that supports verification of purposes, stages and applications. The integration enabled the optimization of all operations of several different companies and trusted data-sharing, which is particularly beneficial if we have financial transactions.

- The information is available to each member node in the blockchain, yet none can alter or change the report without any agreement. This feature of the distributed ledger variation is the most critical point in integrating FREDE. Such type of coordination can be effective in building up trust between various organizations.

- The creation of intelligent contracts presents testimony to the equivalent. After integrating FREDE system, it's easier to optimize internal data control, business process flow, and company-wide transactions. Blockchain shares stable data, stores all the activities between stakeholders — companies, vendors, and suppliers.

- FREDE helps to track the user who performs any change in it. Also, it confirms authorized personnel by using digital signatures based on public-key cryptography and holds the secret key to determine the owner. When integrated with an FREDE system, businesses function ideally and earn higher profits in the long run.

11. FREQUENCY CHAIN ECOSYSTEM

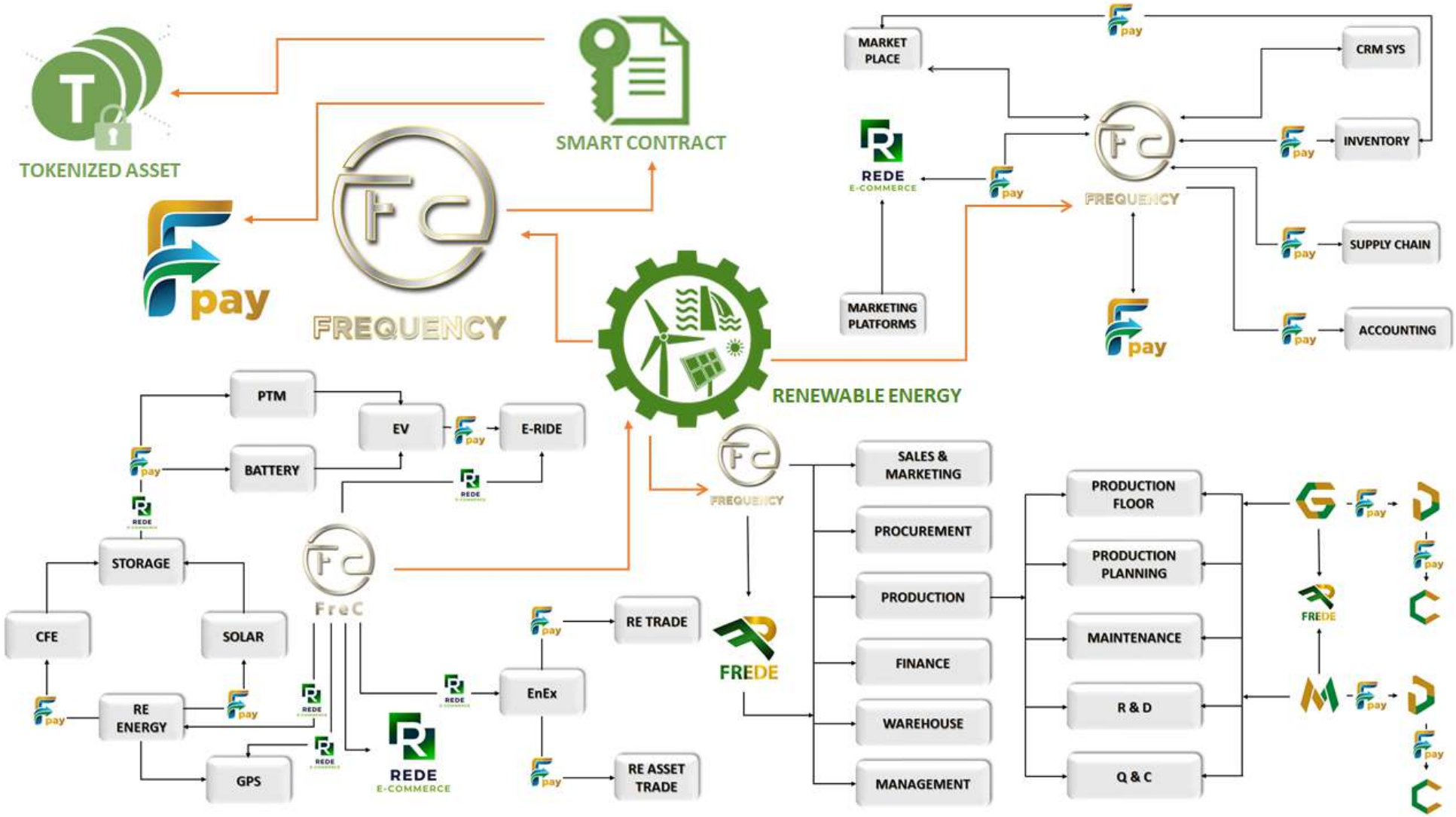


FIG 10 : FREQUENCY CHAIN - ECOSYSTEM

12. CONCLUSION

Blockchain is a breakthrough trust mechanism that can remove the need for costly intermediaries and enable an unprecedented level of transparency, coordination, and information sharing across the Renewable Energy Industry. As such, it has tremendous potential to improve both efficiency and effectiveness, creating value for the entire Renewable Energy industry. Many startups are investing and trying to disrupt industries by leveraging blockchain. And Renewable Energy Industry is no exception. However, capturing the full benefits of blockchain will require a concerted effort on many fronts, which the FREQUENCY CHAIN has captured in its inception. Frequency Chain is built for the present, evolving and the next generation of Renewable energy Industry

The Renewable Energy industry has been consistently catalyzed by innovations. Now, the FREQUENCY Blockchain presents itself as the next emerging technology to spur growth in this Renewable Energy sector through its smart contracts and systems interoperability. Of the many use cases for blockchain, Renewable Energy and sustainability are often less recognized. FREQUENCY Chain covers more than 65 existing and emerging blockchain use cases as identified by the World Economic Forum, Stanford Woods Institute for the Environment, and PwC in their joint report. These use cases include new business models for Renewable Energy markets, real-time data management, and moving carbon credits or renewable energy certificates onto the Frequency blockchain.

Few important use cases that FREQUENCY CHAIN have a deep impact would be, Wholesale Electricity generation, storage, purchase, distribution, Peer-to-Peer renewable energy trading, Electricity data management, energy sharing, improvised and hustle free utilities. Covering the entire Echo system of Renewable Energy Industry, FREQUENCY Chain will be the base for the global Renewable Energy Industry globally.

United Nations says, “It is likely that the key legacy of blockchain will be that when computing power is handed to a large part of the population—rather than solely housed in corporations—completely new solutions to old problems will emerge (Source: “Blockchain and Sustainable Growth” UN Chronicle, Dec. 2018). Frequency chain has brought out solutions not only to the old and existing problems but also to the future and evolving global growth.

The Frequency chain, Version 1.0, which is being released to the Renewable Energy Industry have an wholesome coverage of the entire renewable energy Industries, which brings forth along with enormous advantages to the clients, general public, financial sectors, future technology sectors and the Governments around. The Version 2.0 would be covering the future and evolving transformations and technologies.

13. CHARTS & FIGURES

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