power transition

Introduction

Many of us are concerned about how the world will deal with exchanging value for goods and services across societies, using the plethora of unregulated, volatile cryptocurrencies available today. These apprehensions have percolated into industrial sectors, and the Energy Sector is not alone.

Society's unquenchable thirst for electricity is becoming more desperate, just when the energy sector is undergoing a massive evolution across the globe. Highly inefficient, insecure as well as very polluting, centralised energy infrastructures are slowly evolving to low cost, sustainable, decentralised models.

Energy Sector Challenges

To maintain a balanced, 100% reliable national electricity grid with renewable energy running 24/7/365, grid operators must take frequent pre-emptive, swift actions to sudden shifts caused by variations in consumer demand and environmental conditions. Under the current the infrastructure, customers (prosumers/consumers) are not being properly compensated or incentivised for their contribution to this overall balancing mechanism. The industry lacks the proper tools to accomplish this in a decentralised energy grid infrastructure. Consequently, a few Blockchain based energy trading products have been launched to address these issues with mixed results. Traditional Blockchain based Energy Trading Systems are exposed to volatility of the cryptocurrency markets as well as being shackled by slow transaction rates, high transaction fees and massive consumption of processing power. Legacy products have tried to overcome the volatility issues by tethering to Stablecoins and Smart Contracts, but unfortunately this has simply taken further tolls on performance and cost.

Decentralization of Energy Generation and Management

These future decentralised renewable energy systems will require the support of a new generation high-speed, low-cost DLT network that supports stable fungible value tokens which can be quickly adapted to any market in the world. Hedera Hashgraph running HCS, HTS and MirrorNode technology is the ideal solution. That is why Power Transition is incorporating HTS into its iMaaS (integrated Microgrid as a Service) platform to run with HCS and its native MirrorNode. By integrating HTS, iMaaS can deliver instant energy sector trading and value exchange using Smart Energy Tokens (SET). iMaaS offers the ability to issue and configure SET on Hedera, taking full advantage of Hedera Hashgraph's outstanding performance, security, stability, and governance. HTS SET offers a faster and more efficient alternative to smart contract token creation. This greatly enhances our speed to market by enabling customisable and stable value exchange capabilities. With HTS SET we are now able to quickly localise our energy trading Dapps for any customer, regardless of which country or currency they operate in.

Power Transition's Solution using HTS

We are incorporating HTS SET into our energy trading Dapps in conjunction with HCS and our own MirrorNode to enable automated as well as manual buying and selling among peers. Using the Hedera

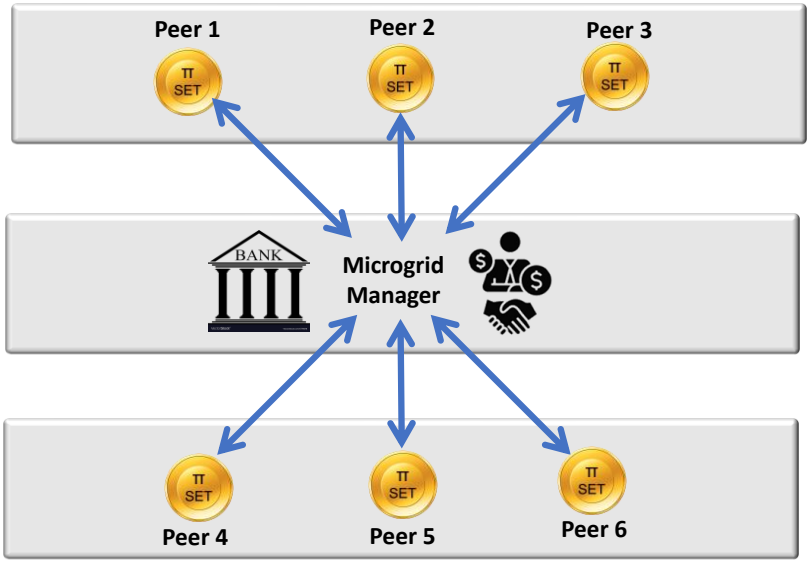
SDK we built our backend in Java and frontend using Angular js. SETs are minted and issued to match dynamic energy pricing in any nation or region.

The possibilities of HTS use cases are only limited by our imaginations! We can add value and attach further information to our tokens during each buy/sell operation along the energy supply chain. These include green energy certifications, and energy aggregation and brokerage services for large commercial energy consumers. Also, during operations, it is much easier for us to segregate pure energy trading values with DLT network and microgrid/grid charges and account for them separately.

The HST SET values track the progress of units of energy throughout their lifecycles from generation, distribution, storage and consumption. These HTS SET values are published into the Hedera DLT using HCS and subscribed to by MirrorNodes. Owners of the SET who are users of the correlated information can then add value and republish the information to the DLT, in the form of iterative producer/consumer near real-time feeds. These feeds of information add HTS SET value with each iteration.

Use case examples of these use cases include the management of Electric Vehicle charging infrastructures with built-in instant payment channels as well as the management of both commercial and domestic microgrids. All of which will fully support the grid energy balancing mechanisms by harnessing real-time data feeds and automated trading. Energy can be bought from renewable producers at low tariff periods and stored until prices rise. The energy is then sold on at a premium price.

The incorporation of HTS into iMaaS allows the Microgrid Manager to develop comprehensive profitable business models in different microgrid implementation scenarios. These implementations can vary from domestic, commercial, or industrial models and vary from country to country.



As illustrated in the diagram above, the Microgrid Manager offers the service of HTS SET banking and accounting facility. Members of the microgrid buy and sell HTS SET via the Microgrid Manager. The local value if the HTS SET is tethered to the value of the local currency. Using HTS SEC the Microgrid Manager can easily act as an aggregation and brokerage service by buying energy from local producers and selling it on to larger commercial consumers, while always undercutting national supplier prices.

Additionally, in developing countries energy impoverished individuals and communities without bank account facilities can still own and operate a digital energy account with HTS SET.

Environmental Issues

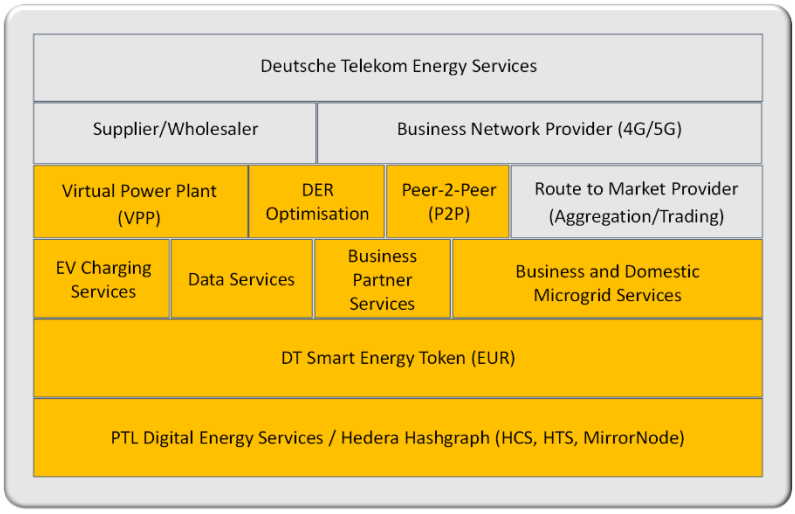
Currently the energy sector emits a disproportionate amount of greenhouse gases. Although the sector is trying to become more sustainable and efficient, there remain considerable challenges within aging infrastructures managed by conservative and often reactionary organisations. Consequently, as commercial, industrial, and domestic demands shift, energy companies are unable to keep up. This results in substandard, imbalanced supplies along with volatile prices.

Many multinational corporations are setting the pace by example, to become sustainably run companies, working towards Net-Zero targets set by United Nations Global Compact – Sustainable Development Goals (UNSDG). Their dependence on electricity suppliers could hamper progress of achieving those Net-Zero targets and goals. Even if a corporation contracts with only green-energy suppliers, evidence shows that the certification of green-energy is questionable and often 'green-washed'. Additionally, in order to veritably achieve Net-Zero, an accurate and trusted CO2e emissions reporting mechanism must be in place, measuring quantitative targets and goals, according to globally accepted values and agreed KPIs, determined by standards such as the UNSDGs.

To mitigate energy risk, corporations need to gain control over their energy future. Ultimately, they must take steps to manage energy use on their own in collaboration with strategic partners. Implementing this strategy will not only mitigate energy risk exposures for them, but create yet untapped profitable new market opportunities for the companies involved. Implementing HTS in conjunction with HCS and MirrorNode technology to manage their own renewable energy microgrids will empower these multinationals to move in this direction.

A good example of this is Deutsche Telekom. Deutsche Telekom plays a key role in telecommunications around the world. As telecommunication services rapidly expand globally with products such as 5G, its dependence on efficient and competitive electricity services grows exponentially. This dependency on energy supply presents a considerable risk exposure for telecom firms. Deutsche Telekom is Germany's second largest electricity consumer. They are ideally positioned to adopt HTS, HCS and MirrorNode to become energy suppliers to both internal and external customers and extend their service along their supply chain, localizing their services across the various borders within which they operate. This will put them firmly in the driving seat to take advantage of the lucrative and untapped business opportunities that achieving Net-Zero can offer.

The following is an illustrative high-level architecture stack of a strategic rollout of energy services of a large corporation, highly dependent on electricity such as Deutsche Telekom:



Our Business Challenges and Roadmap

Our principal challenge is creating a way to easily and flexibly mint various smart energy tokens in a single Dapp which can be tethered to any fiat currency. We have worked on TestNet and MainNet and have not come across significant technical challenges but were able to get HTS up and running in record time, working harmoniously with HCS and our Mirror Node.

HTS has enabled our team to create the first truly stable, extremely high performing and easy to implement, energy trading platform running on DLT.

We are now investigating ways to quantify and trade energy sector related carbon emissions. By Q4 2021 we plan to be running a working prototype of an open-market energy and carbon auction platform based on HTS.