



# WHITE PAPER

We believe empowering individuals and communities to co-create their energy future will underpin the development of a power system that is resilient, low-cost, zero-carbon and owned by the people of the world.

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## **BUSINESS AND INDUSTRY OVERVIEW**

### THE POWER OF POWER

The energy industry used to be simple.

Vertically-integrated utilities sat in the middle of the system, like benevolent spiders spinning a web out to the last consumer requesting connection: they decided where and when to build generating capacity; they decided how to bridge the distance between generators and loads; they kept the system in balance through the deft application of the levers available to a centralized controlling entity. While progressive utilities and regulators try to position themselves as consumer-focused or consumer-centric, the reality is, even the most progressive are only rephrasing a narrative that pushes citizens into categories of consumers. Clinging to the umbilicus of the power network, consumers are fed a steady diet of price and product. The cost of energy security can be counted in terms of control, certainty and economic independence.

But a global technology revolution has changed the power balance between consumers and centralized power authorities. The booming market in Distributed Energy Resources (DER) like solar

photovoltaic systems (PV), batteries, microgrids and embedded networks has moved the power balance from central authorities to the edges of the grid, to where citizens have control.

And it is not just about controlling the cost of energy consumption, it is a reflection of peoples' desires that their energy supplies are more sustainable, more socially-responsible, more local, more resilient and more democratic. All that is needed to move the revolution into the mainstream is a model for energy trading that takes control out of the hands of central players and puts everyday citizens in charge of a co-created energy future.

The nvscoin Ecosystem is that platform.

## THE MARKET SIZE

### STATIONARY ENERGY

Electricity is a critical enabler. The current electrification state of the global population is at 84%. Advanced and transitional economies require secure access to modern sources of energy, to underpin their development and growing prosperity. In developing countries, access to affordable and reliable energy is fundamental to reducing poverty, improving health, increasing productivity, enhancing competitiveness and promoting economic growth. Hundreds of millions of people have attained modern energy access over the last two decades through distribution networks, especially in China and India. This means that more people on Earth than ever before are now connected to ever-growing and interconnected electricity networks. This creates an enormous appetite for innovative new energy peer-to-peer (P2P) energy transaction platforms.

### NON-STATIONARY ENERGY

In addition to stationary electricity consumers (buildings, factories, apartments and houses), non-

stationary electricity users are driving up electricity demand across the globe. The year 2015 saw the global threshold exceed 1 million Electric Vehicles (EV) on the road, with the total number closing at 1.26 million. To service this growing fleet, there were an estimated total of 1.45 million electric car charging points worldwide in 2015. EVs are forecast to reach price parity with combustion

engine cars by 2025, largely due to falling battery cost and increasing fuel density. The deployment scenarios for the stock of EVs range:

- o Between 2 to 20 million EVs in use worldwide by 2020;
- o Between 18 to 60 million by 2025; and
- o Between 22 to 140 million by 2030.

## AN ENERGY REVOLUTION

In 2012 in New York City, Hurricane Sandy destroyed the century-old concept of utility power supplies and heralded a new era of distributed energy supplies that value resilience over tradition.

In Republic of Korea, in the years between 2014 and 2018, more new generating capacity was installed on residential roofs than was connected to transmission networks.

There is an inconvenient truth facing the traditional energy supply industry: at some stage, it will be cheaper and more effective to self-supply than to rely on the network to provide low-cost and

reliable and clean energy.

## A TRUSTLESS TRADING PLATFORM

A trading platform is a network that allows consumers to sell energy to their peers in a trustless environment.

It is a new component of the distributed economy that allows consumers to realize the value of their investment in SPSI by allowing them to monetize their excess energy in much the same way as Uber and AirBnb allow people to monetize their cars and spare rooms.

A trading platform that requires third-party settlement and reconciliation of millions of transactions between hundreds of thousands of traders across 5- minute trading intervals would be almost impossible to support without a central player taking control of all parties' data, prescribing fees, requiring trust,

proving accuracy and binding the market up in red tape and bureaucracy. But the blockchain is an agreement machine that can facilitate the financial settlement of these transactions, in the same trading intervals in which the energy is produced and consumed, and it can be achieved at a speed not possible using current market settlement technologies.

Blockchain-enabled P2P energy trading will transform energy networks into trading platforms and invoke a transactive economy that moves away from bilateral retail arrangements to multi-lateral trading ecosystems, preserving networks' relevance to consumers.

## WHAT IS BLOCKCHAIN TECHNOLOGY

Blockchain is a software innovation for establishing digital trust between users facilitating transactions of value, over a network. The blockchain enables trust to be distributed throughout a

network, without the need for a central intermediary to track, verify and approve the digital exchange of value. The notion of authorizing trust from a central intermediary currently underpins both private and government institutional structures, however this is proving to be costly, slow, and also vulnerable to attack. The blockchain overcomes these issues by operating as a decentralized distributed database, maintaining a continuously growing list of records called blocks. Although blockchain technology is still an emergent one, current applications show it can be better, more efficient and more secure than traditional systems, which is why banks and governments globally are beginning to experiment with it.

## SMART CONTRACTS

On-chain computer code or “Smart Contracts” are computer protocols that facilitate, verify, or enforce the performance of a contract making a contractual clause unnecessary. Smart contracts

often emulate the logic of contractual clauses. Smart contracts can exchange money, property, shares or anything of value in a transparent, conflict-free way, while avoiding the services of a middleman. Ordinarily, a process would require payment to a middleman, government agency, bank, lawyer or a notary, and then a processing time before the receipt of goods or services. However, with smart contract technology it can all be automated. Smart contract technology can be compared to that of an automated vending machine. With a vending machine, money is deposited into the vending machine and the desired item drops for collection, provided that the correct amount is deposited. Comparable to that, with a smart contract, the money is deposited into escrow on the blockchain for receipt of a transfer of a token (e.g. a digital certificate of title for a house), which is instantaneously transferred into a counterparty's control once conditions are met. Smart contracts not only define the terms and conditions around an agreement in the same way that a traditional contract does, but also provide enforcement of those obligations.

## WHY SOCIETY NEEDS AN ENERGY TRADING PLATFORM

It is not just network service providers that benefit from maintaining the relevance of one of our most important social assets. The people that have the most to lose in the face of falling network utilization are the people that have the least ability to influence their exposure to rising network costs and the impact on grid-supplied energy.

The financially and socially marginalized renters, the huge number of tenants living in group housing developments and even those whose homes are oriented in the wrong direction or are exposed to shading from nearby buildings or trees, are the people who will bear the impact of falling network utilization if we do not find a way to incentivize Prosumers to stick tight to the network.

Unlike the centrally-managed power systems of the past, the future of the energy system, will be co-created by the prosumers and investors that will decide where and when to install SPSI.

### HUMAN ENERGY

Energy trading between citizens brings humanity to the energy system.

Instead of faceless traders hedging their positions, Citizen Utilities return profits to communities,

incentivize community investments in generating assets, and allow the sharing or gifting of energy.

Ultimately, as dynamic distributed energy markets become mainstream, the owners of SPSI can earn an income, not just from the energy they sell but from the network services they provide such as frequency and voltage control, load shifting, load shaping and load sinking.

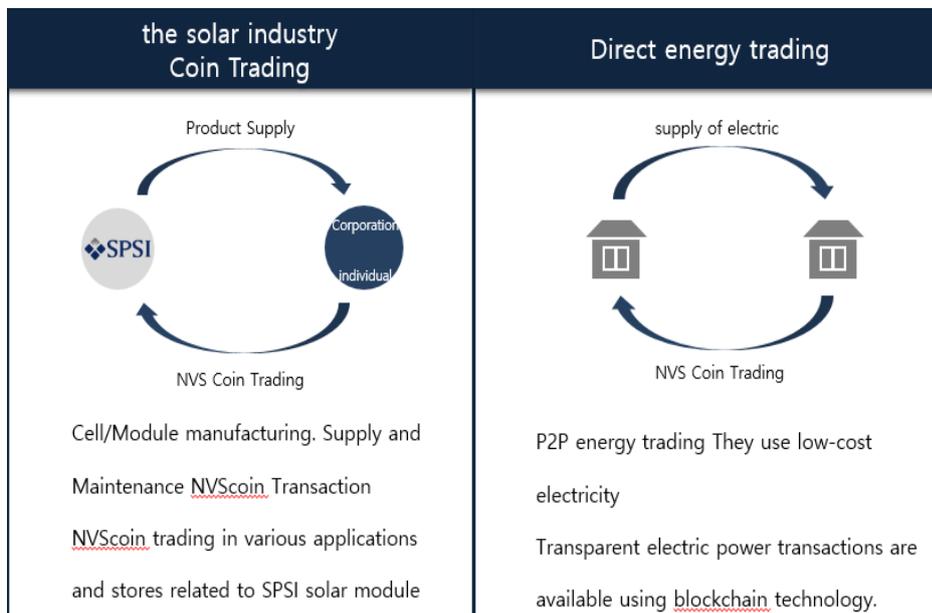
Human energy will change the face of the energy system because instead of being focused solely on profits, it will focus on the broader needs of communities, on aspirations for independence and co-creation, and the longterm sustainability of energy creation and consumption.

## THE NVS PLATFORM

The NVS Platform is a trust, transparent and

interoperable energy trading platform that supports an ever-expanding suite of energy applications, with an exchangeable frictionless energy trading token, nvscoin.

Energy trading applications are not just conceptual, they are proven and deployed in communities and energy markets around the world including Europe and Asia.



### P2P TRADING

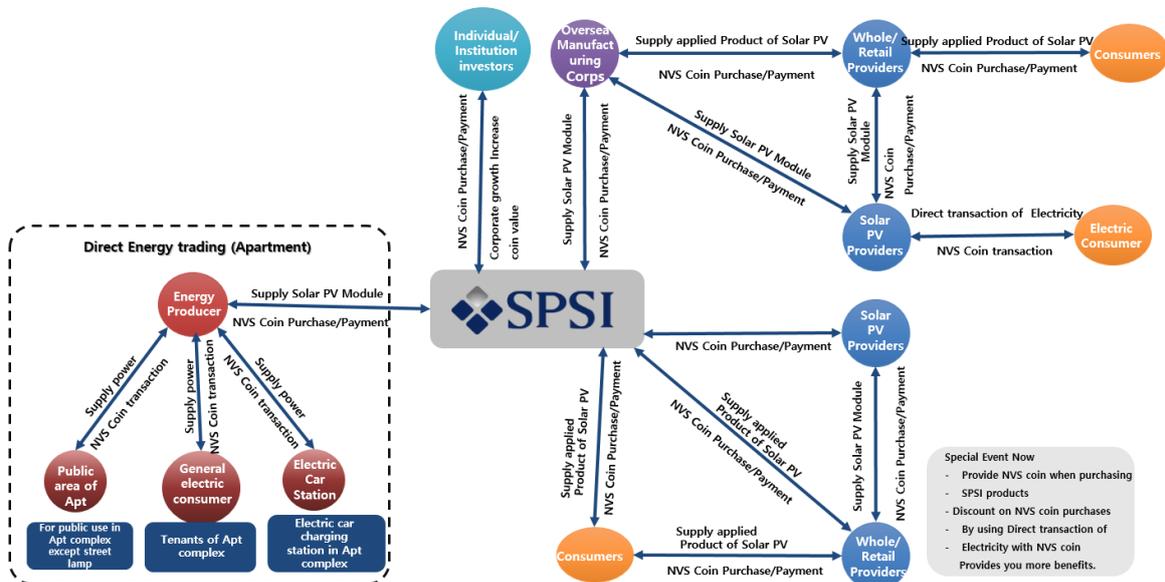
This class of Platform Application gives retailers the ability to empower consumers (or in an unregulated environment, the consumers themselves) to simply trade electricity with one another and receive payment in real-time from an automated and trustless reconciliation and settlement system. There are many other immediate benefits such as being able to select a clean energy source, trade with neighbors, receive more money for excess power, benefit from transparency of all your trades on a blockchain, and very low-cost settlement costs, all leading to lower power bills and improved returns for investments in distributed renewables.

## ELECTRIC VEHICLES

This class of Platform Application facilitates real time metering data (interfacing with the Open Charge Point Protocol (OCPP)), collection of data, user identification and rapid transaction settlement.

## CARBON TRADING

This Platform Application class offers smart contracts for carbon traders to assure digital transactions across organizations: credibility of asset using immutable distributed ledger technology; and transparency and auditability. It supports reporting and surrendering of carbon credits or certificates to regulatory authorities.



## NVS Coin Development Algorithm and Token Generation Method

1. SHA-3 series cryptocurrency hash function
2. Automatic difficulty adjustment
3. Use introduction
4. Digital asset representation possible
5. Not possible to falsify or copy intellectual property
6. Marketplace function

Keccak is a SHA-3 cryptocurrency hash function standard published by the National Institute of Standards and Technology (NIST) in August 2015.

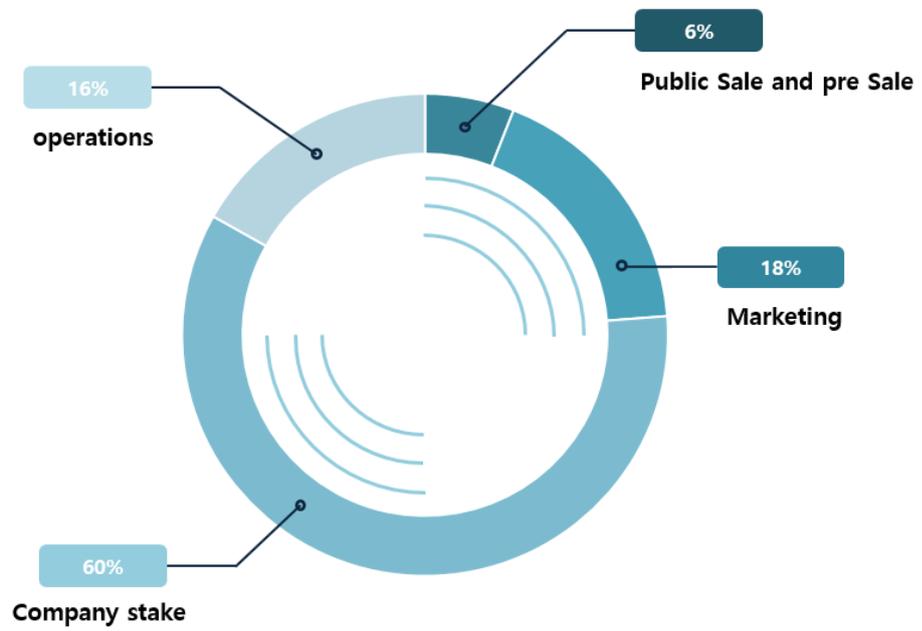
In contrast to bitcoin, which uses the SHA-2 series algorithm, NVS coin is not derived from SHA-2 but uses the different SHA-3 series Keccak256 algorithm, making it safer than SHA-2 with 3-4 times faster computational speed than existing mining methods.

Difficulty is not fixed, but difficulty is adjusted according to change of mining stage.

The NVS coin uses the improved token issuance method of ERC721 (EIP918) to enable the mining of unique tokens while allowing the presentation of the characteristics of the existing ERC721 and the representation of digital assets (in-game contents and works). It also makes it impossible to falsify or copy intellectual property rights.

In addition, the value of individual assets, operational transparency, and market place Dapps (Decentralized applications) for trading and exchange are possible.

## DISTRIBUTION



## ROADMAP



It is not the possession of specific groups or institutions but it's the thing that many non-specific people such as ordinary people can participate. Furthermore, this will increase the value of the coin along with the growth of the Solar PV business, so everyone who buys the coin can benefit.