



# Whitepaper

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# The World Energy Market: Outlook and Challenges

Our global energy landscape is changing. Traditional centers of demand are being overtaken by fast-growing emerging markets, all the while technological advances and environmental concerns are shifting the world's energy mix. Now - more than ever – the energy industry must adapt in order to successfully fulfil our need for sustainable power.

What we are witnessing nowadays is a shift from the more traditional pillars of the energy sector - such as coal-fired power plants and onshore oil and gas fields - to an energy sector where hydropower and other renewable energy sources provide significantly larger shares for market consumption. With the world's net electricity production forecasted to grow by 45% to a total of 34 trillion kWh in 2040, latest macroeconomic analyses focus on five main challenges that endanger the energy ecosystem:

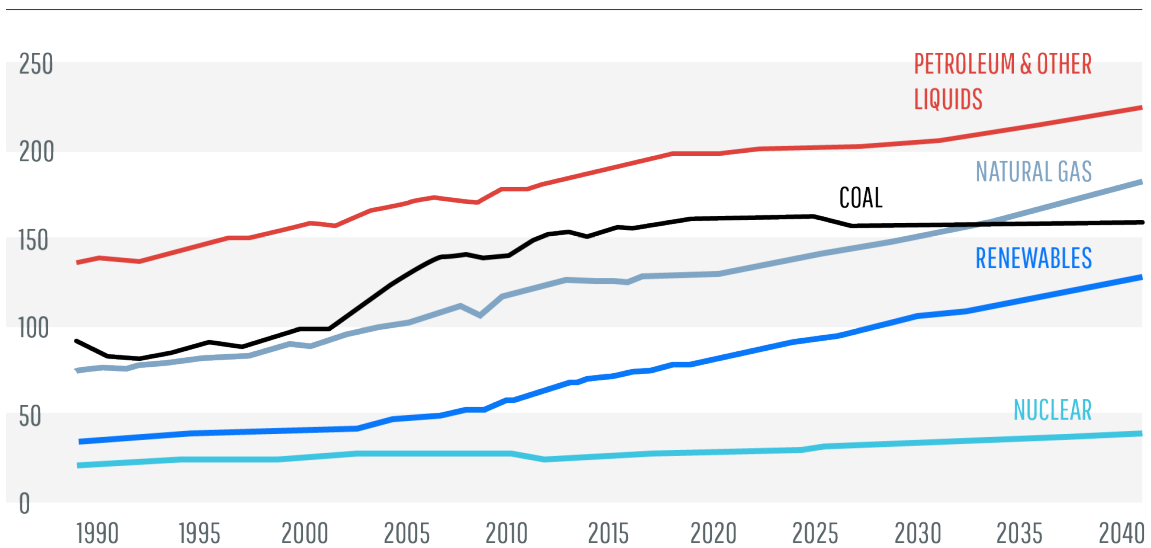
- Maintaining a balanced and diversified energy mix;
- Assuring further development of natural gas infrastructure and supply;
- Expanding the role of biomass in household heating;
- High-efficiency cogeneration and modernization of CHP production facilities<sup>1</sup>;
- Increasing energy efficiency all the while countering energy poverty.

According to the US EIA<sup>2</sup>, latest projections show an increased world consumption of marketed energy from all fuel sources through to the year 2040. Renewables are currently the world's fastest-growing energy source at a rate of 2.3%/year (2015 - 2040), with nuclear power on second place with a 1.5% yearly increase during the same period. 20% of total power consumed worldwide is currently attributed to residential and commercial sector accounts combined, but these are currently forecasted to grow by 1.1% per year until 2040.

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1 *CHP = Combined Heat and Power producers for centralized heating*

2 *US Energy Information Administration*



World energy consumption by energy source - Quadrillion Btu

While each market member has its own unique set of requirements and products, the electricity market can be structured into the following categories of participants:

- Producers
- Suppliers
- Electricity market operators
- Transport and system operators (TSOs)
- Distribution system operators (DSOs)
- Electricity traders
- Final customers.

With respect to the nature of electricity and trading market frameworks:

- producers may generate more or less energy than estimated and sold;
- customers may consume more or less energy than contracted;
- and traders may buy more or less energy than they have sold.

Such cases, known simply as energy imbalances<sup>3</sup>, are instances where energy is (in effect) bought from or sold to the NGTS<sup>4</sup>. For each trading period two *cash-out* prices<sup>5</sup> are used to settle such differences. Electricity balancing arrangements, and in particular cash-out prices, provide incentives for producers and suppliers to invest in secure supplies and better *balance* positions in order to meet demand, especially when the systems are stretched to their limits.

They are therefore pivotal to securely deliver the electricity in a competitive market. In particular, we expressed concerns that cash-out prices are not providing the correct signals for the market to balance itself, thus increasing supply security risks and undermining balancing processes' efficiency, ultimately increasing costs unnecessarily.

That being said, one of today's major issues is that service balancing mechanisms are overly complex, inaccessible to certain segments of producers or suppliers within workable time spans, and at times simply unreliable.

Another well-established problem is that the market isn't amiable to end-consumers, although it is at worst partially and at best fully privatized – meaning consumers should have the option of choosing whatever vendors they like.

We respond to these strategic challenges by creating and deploying a completely new, simple and transparent platform, designed to deliver real value for every consumer. The Bittwatt platform empowers the smart-consumer to find best available supply solutions, and provides the consumer with a decentralized market place that functions on the transparency and full disclosure of information facilitated by the blockchain.

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3     *the amounts of energy generated or consumed and not covered by contracts*

4     *NGTS = National Grid Transmission System*

5     *also known as 'energy imbalance prices'*

# What Problems Does Bittwatt Solve?

As things stand today, the current energy ecosystem is built around the exchange of what is essentially unstructured information. This means that literally countless types of documents are used to either sell or buy electricity, and an increasingly large number of commonplace processes (be them back or front-end) are in truth redundant, and lead only to higher prices.

Despite electricity exchange being regulated in nearly all of the world's countries, in real-world situations what we see is the buildup of significant latencies. Case in point:

- Energy exchanges between traders (or producers) and suppliers (B2B) take days for validation and completion to be completed, and there is no decentralized market where these can take place.
- There is no market for smart-consumers (B2C) from where they can a) transact unused energy supplies and b) choose and switch suppliers based on pre-selected criteria.
- Reporting electricity consumption from suppliers is done with a latency of at least 15 days, so that unbalances cannot possibly be corrected accurately or in real time.
- Energy transit is mandatorily done through the prior booking and setup of cross-border electric lanes; what's more, once a cross-border lane is booked, it cannot be used by more than a single party - as there is currently no system in place to facilitate multi-party transfer. This is the case, despite multi-party transfer being both legal, as well as rational – since two entities (i.e. one that concedes unused lane space and the other that takes up unused lane space) can benefit at the same time from proper use of resources.
- End-consumers (of the domestic sort) must wait at least 15 days to change energy suppliers; at most, for purely bureaucratic reasons, this process can take 90 days. (E.g. United Kingdom – 15 days, Austria – 30 days, Germany – 2-6 weeks)

It's because of all of these reasons that prices increase. With energy transit slowed-down or even inaccessible as a real option (due to temporal, financial, or bureaucratic constraints), what all parties in the ecosystem face is a gradual yet unpredictable increase in costs. From a technical perspective, this can be summed up simply in that the ecosystem is devoid of a smart demand-response system:

- In terms of grid pressure (which is to say that production cannot be adapted to the demand in the system), and
- Commercial implications (no decentralized market exists so as to keep supply offers and request together in order to enable fast switching)

This lack of adjustability, increases costs dramatically for suppliers of energy (imbalances costs up from 300-400% from normal levels), creating a snowball effect that eventually hits end-consumers.

This is the problem we are fixing.

# An overview of Bittwatt

## OUR VISION

We envision a world of smart-consumers in a sustainable energy system with minimal costs for all parties.

## OUR MISSION

Our mission is to be the first international platform to integrate and facilitate cooperation between all market operators for the benefit of the consumer.

## OUR GOAL

So as to achieve these, we are committed to:

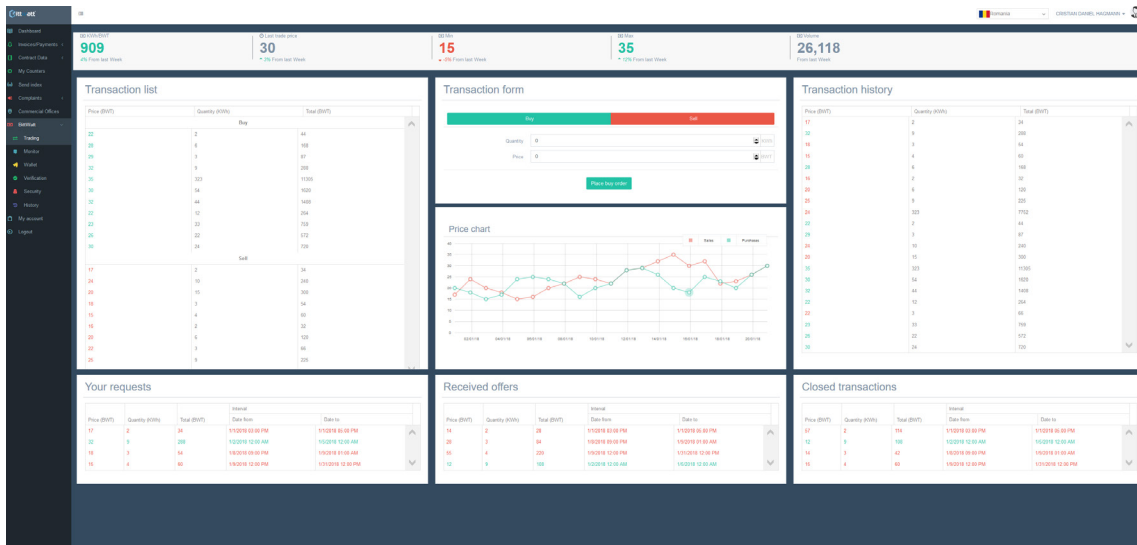
- creating a blockchain enabled energy trading market that is simple, transparent and delivers more value to all its users.
- expanding globally (London, Bucharest and Singapore being already under development).

## THE BITTWATT PLATFORM

We are now changing the way we operate electricity systems by building a smart, flexible system that makes the most of all energy sources and enables us to exceed our customers' needs in a balanced and financially efficient ecosystem that learns and evolves.

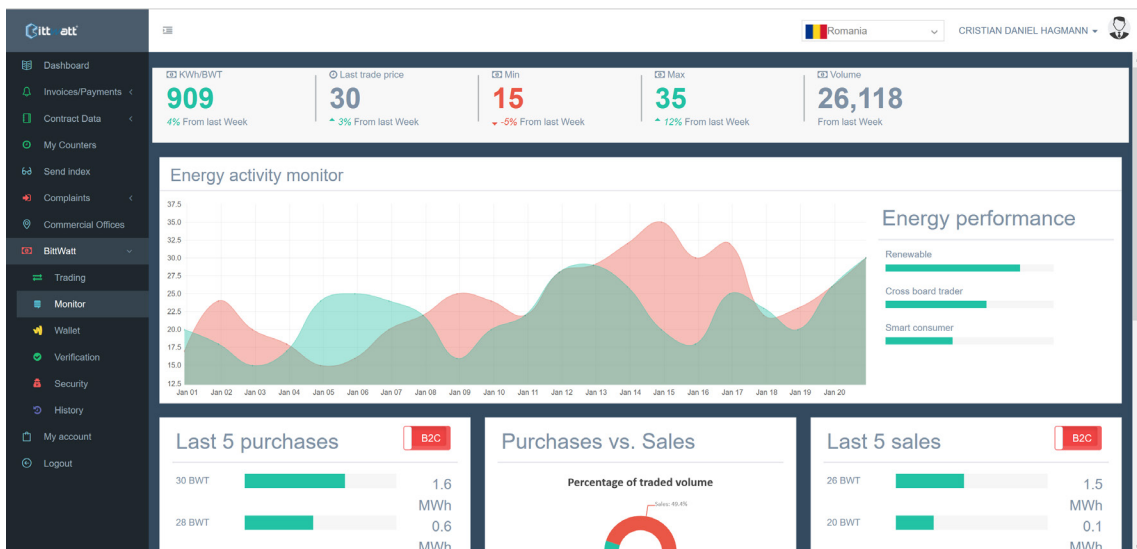
For this purpose, we have started developing a new marketplace for electricity balancing and trading – which is blockchain enabled - that incentivizes producers and opens up competition on a level playground.





We aim to deliver this completely new and highly cost-effective energy ecosystem fully by 2022.

The platform will be accessible to everyone in the industry – regardless of size – running new technologies alongside industry standard applications. This market framework is designed to empower users (producers, suppliers or traders) in applying balancing processes, and requires little intervention from Bittwatt as a System Operator (SO).



The Bittwatt ecosystem is in effect a matchmaking platform which connects producers, energy suppliers and smart consumers (as well as prosumers<sup>6</sup>) in order to transact energy in a structured way. It is a flexible system that makes the best of all available resources and is able to meet customer needs much more efficiently. To this end, we have integrated metering services that allow both new and existing supplier to communicate quickly and trade energy in a timely fashion within a secure framework.

## THE BITTWATT BUSINESS MODEL

Our business model starts with active power suppliers for each participating country (i.e. in each country where Bittwatt is operational), being registered within the Bittwatt platform after successfully meeting a set of qualification and onboarding requirements.

Producers, suppliers, grid operators and consumers must register on the platform based on KYC criteria. The match between offers and requests is to be met through smart contracts that operate on the basis of individually defined rules (e.g. specifications as per quantity, type, price, and so on). The flow of electricity is then automatically coded into the blockchain and algorithms match buyers and sellers, in real time, based on their predetermined set of preferences. Finally, smart contracts execute when electricity is delivered, thus triggering the payment from buyer to seller.

The platform, therefore balancing the energy supplied and that delivered, bills traders who delivered more or less energy than specified in their schedules. Such deviations are determined from smart meter readings from consumers and producers.

To ensure generation matches demand continuously and flawlessly, the Bittwatt platform will:

- \* Enable the sharing of real-time consumption data through the blockchain (creating a smart demand-response program)
- \* Make use of a highly reliable system that will be able to match demand with supply in real-time, based on the criteria set by each party;

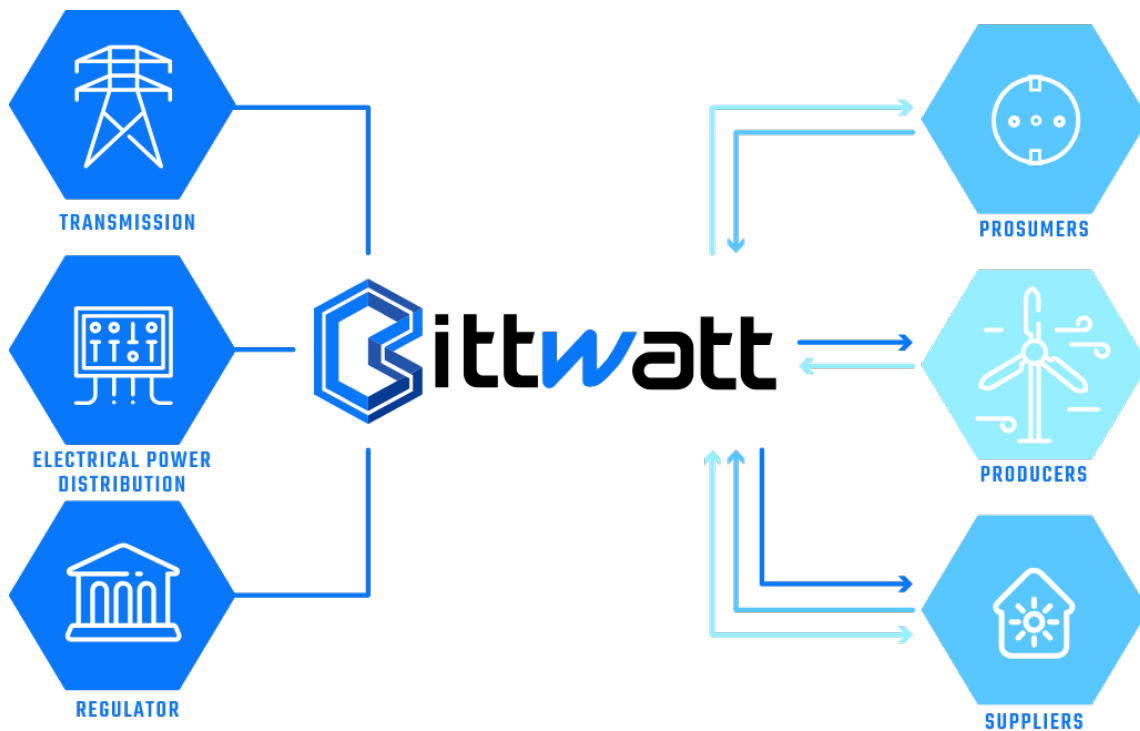
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*Prosumers = active energy consumers, who both consume and produce electricity*

\* Integrate reserve generation capacities – as Bittwatt can call on power plants (which are already generating) to increase or decrease their output for limited periods of time through the balancing mechanism system of bids and offers. This of course includes pumped storage – or reserve hydroelectric power stations, which can generate power within seconds;

\* Integrate a smart demand-response programs that consumer can take part in by selling their unused electricity on peak price periods to reduce pressure on the grid (which) actually determines high prices.



As such, the main benefits brought by Bittwatt are:

- Cost reduction in comparison with other energy transfer systems;
- Transaction speed increases;
- Scalability (we give the possibility of expansion to a large number of participants/users/ transactions);
- Disintermediation (making business model possible that do not require intermediate parties)

## TECHNOLOGY STACK

On top of Ethereum, we have built Bittwatt services using Geth. Geth is a multipurpose command line tool that runs a full Ethereum node implemented in Go. In this case, it is running on a proprietary Linux server with no RPC/HTTP open ports. The communication, which involves Geth, is managed through a Python intermediary application and the Ethereum network.

The applications that connect to the Ethereum blockchain are built on Truffle. Truffle is a development environment, testing framework, and asset pipeline for Ethereum. We use Ethereum Truffle for:

- Built-in smart contract compilation, linking, deployment and binary management;
- Configurable-build pipelines with support for custom build processes;
- Network management for deploying to many public and private networks;

Communication with the Ethereum node is done through the JSON RPC API. JSONRPC is a stateless, light-weight Remote Procedure Call (RPC) protocol. Primarily, this specification defines several data structures and the rules around their processing.

The smart grid we use incorporates digital technology and advanced instrumentation into the traditional electrical system, which allows utilities and customers to receive information from the grid as well as communicate with the grid. A backend application then makes the electrical system more reliable and efficient by helping utilities reduce electricity losses and detecting as well as fixing problems faster. The application (which we refer to as the smart grid) can help consumers intelligently manage energy usage, especially at times when demand reaches significantly high levels or when a reduced energy demand is needed to support system reliability.

Smart devices in homes, offices and production facilities can inform consumers and their energy management systems of times when an appliance is using relatively higher-priced electricity. This helps consumers, or their intelligent systems, to optimally adjust settings so that, when supported by demand reduction incentives or time-of-use electricity rates, they can lower their energy bills. Smart devices on transmission and distribution lines, as

well as at substations, allow utility companies to more efficiently manage voltage levels and more easily find out where outages or other problem are on the system. Smart grids can sometimes remotely correct problems in the electrical distribution system by digitally sending instructions to equipment that can adjust the conditions of the system. By sharing the public parts of such information on a common blockchain, all other operators (producers, suppliers, consumers) can adjust their behavior or take immediate actions in order to limit possible losses.

# Token and Protocol design

By using Ethereum as the abstract foundational layer, [Bittwatt](#) is able to implement all the features and rules of its protocol directly into smart contracts, which are then deployed and processed by the network. On top of Ethereum, the services are built using Geth - a multipurpose command line tool that runs a full Ethereum node implemented in Go. In this case, it is running on a proprietary Linux server with no RPC/HTTP open ports. The communication, which involves the Geth, is also managed through the Ethereum network.

We will develop an ERC20 token with eighteen digits after the decimal point and the ticker symbol BWT. This will become the foundation for all operation within the ecosystem.

[The total token supply is 400,000,000 BWT.](#)

[A \(1, one\) BWT token represents a transferable token equivalent to 1 kWh.](#) The BWT token is used for paying for electricity in the Bittwatt platform, regardless of geography or supplier (as long as the energy supplier is a Bittwatt partner).

## THE TOKEN LIFECYCLE

Main uses of the BWT token include, but are not restricted to:

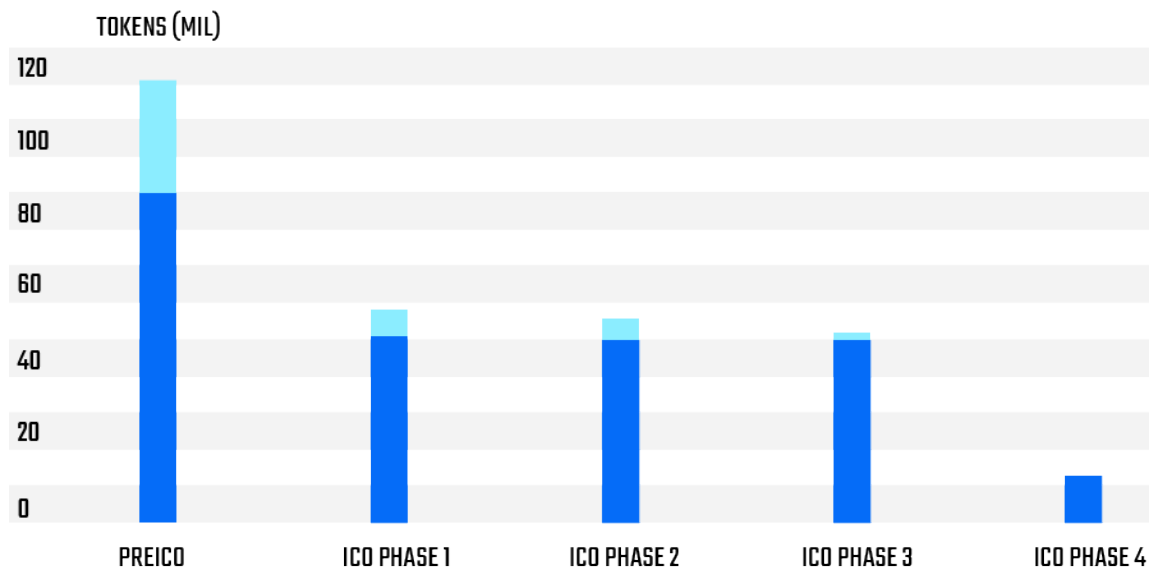
- Payment for the products and services offered by Bittwatt;
- Settlement between produced and consumed energy for prosumers. Producers of energy also consume it by being part of the grid so we are balancing their consumption based on how much they pump in the grid against how much they take out;
- Foundation for the development of tokens used within certain geographies. We are aware that some of the countries using our platform need a currency for their internal trading flow. Therefore, based on BWT, new tokens will be built.

# Token sale

The Bittwatt Coin Sale Goal is the equivalent of **\$30,400,000.00**. The minimum funding goal is the equivalent of **\$25,300,000.00** (soft cap). Pre ICO was a grand success as we raised 10.8 MN USD in less than 5 days. (121,500,000 BWT tokens sold)

Stage	Start	End	Duration	Tokens	Bonus	Total
Pre-ICO	18.03	22.03	5 days	90,000,000	35%	121,500,000
ICO Phase 1	01.04	15.04	14 days	26,500,000	20%	31,800,000
ICO Phase 2	15.04	29.04	14 days	28,156,250	15%	32,379,688
ICO Phase 3	29.04	13.05	14 days	29,812,500	10%	32,793,750
ICO Phase 4	13.05	27.05	14 days	33,125,000	-	33,125,000

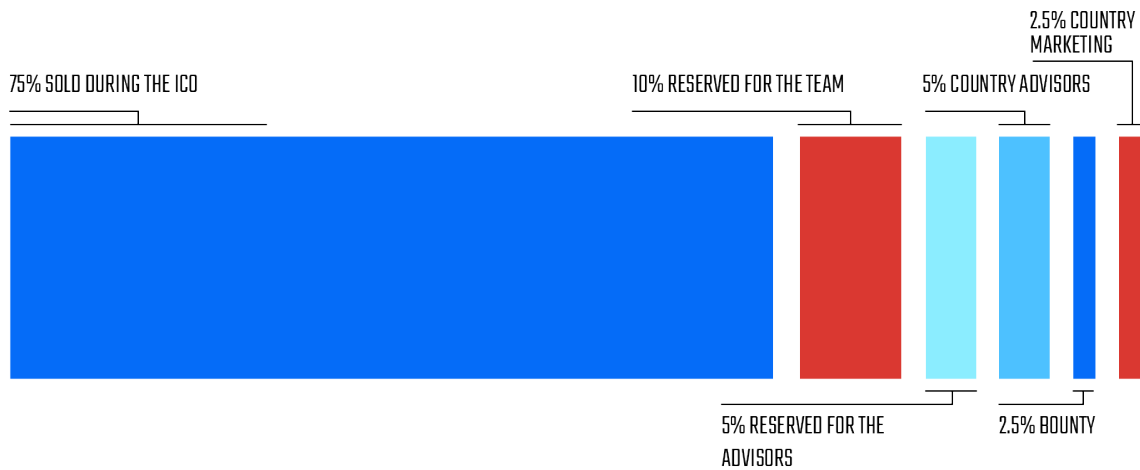
Any unsold tokens will be burned.



During the sale we are accepting contributions in BTC, ETH and COSS. [The minimum private sale contribution is the equivalent of \\$10,000.00.](#)

As previously stated, the BWT initial supply is **338.6 million tokens**. These are split into six categories:

- 254,000,000 tokens are sold during the ICO; (75%)
- 33,800,000 tokens are reserved for the team; (10%)
- 16,900,000 tokens are reserved for advisors; (5%)
- 16,900,000 tokens are reserved for country advisors; (5%)
- 8,500,000 tokens are reserved as bounty; (2.5%)
- 8,500,000 tokens are reserved for country-level marketing; (2.5%)





# Business Plan

## PROCEEDINGS OF FUNDS

The funds raised during the contribution period will be used solely for the development and further product design and marketing of Bittwatt as detailed in the following:

- 55% (approximately \$13,750,000.00) of funds will be used for expansion and marketing purposes;
- 30% (approximately \$7,500,000.00) of funds will be used for software development;
- 15% (approximately \$3,750,000.00) of raised funds will be used for integration with already existing, traditional platforms;



**55%**

**OF THE FUNDS WILL BE USED TO EXPAND THE BITTWATT BUSINESS MODEL TO +30 GLOBAL MARKETS.**



**30%**

**OF THE RECEIVED FUNDS FOR THE BITTWATT PLATFORM DEVELOPMENT.**



**15%**

**OF FUNDS WILL BE USED TO INTEGRATE THE BITTWATT PLATFORM TO THE EXISTING ENERGY INFRASTRUCTURES ACROSS TARGET MARKETS.**

Bittwatt has the strong potential to provide a solution for the Energy Sector by ensuring the following solutions to today's problems:

- Multiple parties share data – multiple participants can view shared information.
- Multiple parties update data – multiple participants can take actions that need to be recorded and change the data;
- Requirement for verification – participants can trust that the actions that are recorded are valid;
- Intermediaries add cost and complexity – removal of central authority record keeper intermediaries will reduce cost (e.g. fees) and complexity (e.g. multiple reconciliations);
- Interactions are time-sensitive – reducing delay has business benefit (e.g. reduced settlement risk, enhanced liquidity);
- Transaction interaction – transactions created by different participants depend on each other;

## PRODUCTS AND SERVICES

### Electricity billing / payments / forecast

#### Billing:

For energy suppliers in particular this is a welcome application as it gives opens the possibility of significantly reducing human error and administrative costs normally associated with this type of transactional activity. Accurate billing and access to full billing history will in turn increase customer confidence and retention of the existing customer base.

#### Payments:

Debt collection for energy suppliers can be a complex process. Our method will make things easier and faster. Every consumer will need to have a credit card attached to their account, and when the invoice is generated they will be debited with the invoice value, significantly reducing associated administrative costs.

*The billing and payment processes are already integrated in the existing Commercial platform of Bittwatt which currently<sup>7</sup> services 2 suppliers across 2 countries and more than 50.000 end consumers.*

### **Forecast:**

Designed for a broad range of users, the solution offers automatic, configurable and manual modes so users can retrieve forecasts and modify scenarios interactively. Automated forecasting means less manual input and makes large forecasting processes more manageable and user friendly.

## **E-Mobility & Energy Roaming**

Electric vehicles are an essential part of the solution to meeting Europe's climate sustainability goals and energy targets. Being three to four times more energy-efficient than conventional cars, but also enhancing air quality and noise levels reduction in densely populated urban areas, electric vehicles will play a growing role in mobility and transportation.

2017 saw multiple European nations starting on this new trend. [France announced that it plans to ban new petrol and diesel cars by 2040](#), and the British government followed soon after with a similar announcement. This triggered an avalanche of announcements from car companies around their common intention to produce more EVs in European and global markets. Numbers are expected to grow rapidly as Volkswagen Group announced that they will be developing 80 new electric models by 2025, as well as BMW with 12 different EV models by the same time, and Honda announced that 15% of their annual sales will be from electric cars by the year 2030.

Considering EVs technology is surely being set up for mass deployment, the industry and policymakers alike must ensure that these processes live up to their potential and help transform the energy system. While there have already been some positive signs from policymakers, a clear framework lacking as of yet despite it being desperately needed.

We offer market opportunities for players in the field of electric mobility and make it even easier for individual drivers to cross national borders while enjoying the advantages brought by EVs. With that, our open platform connects the back offices of our ecosystem partners in order to turn Europe into a single, large charging-network. What's more, E-mobility is an option

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<sup>7</sup> February 2018

on our platform that enables the exchange of roaming authorization, charge transaction and charge point information data. And we offer market players in electric mobility cross-border interoperability between networks. With all that said, we reiterate that our mission is to foster the sustainable development of e-mobility by enabling reliable data exchange through a single connection, and a single interface.

## Arbitrage Energy / Exchange

Through this app, users can leverage energy storage through smart devices in order to purchase energy when it is cheap (or free), and either use it or resell it when prices peak, thus enabling an exchange of energy that also sets the foundational layer of our demand – response mechanism.

## Peer-to-peer Settlements

The platform provides a multilateral framework for energy cooperation that is unique under international law. It is designed to promote energy security through the operation of more open and competitive energy markets, while respecting the principles of sustainable development and sovereignty over energy resources - and most importantly, while respecting national laws in each operating country.

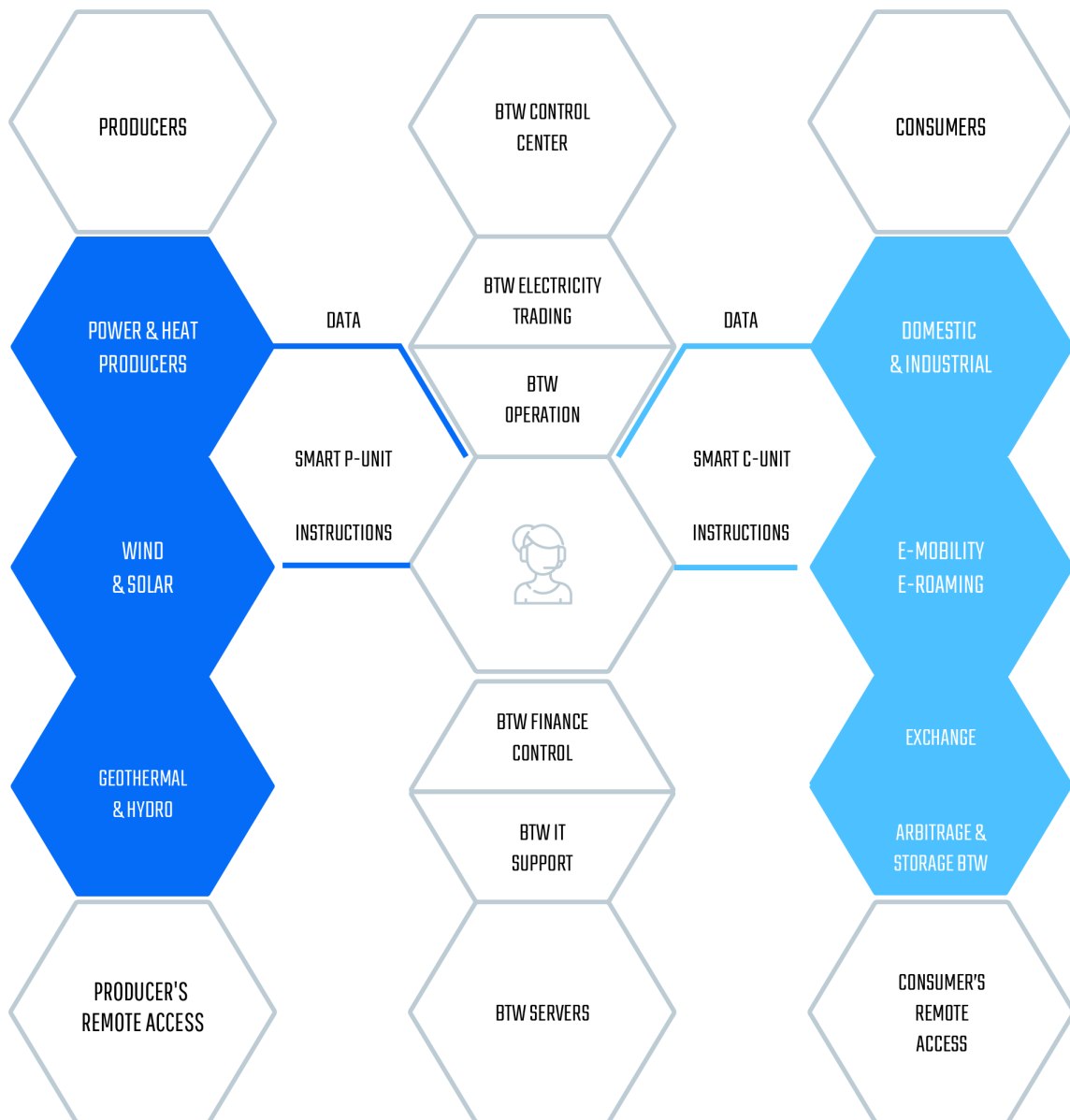
Our scope revolves around improving security of energy supply, and maximizing the efficiency of production, conversion, transport, distribution and use of energy – all that to enhance safety and minimize environmental concerns and risks on profitable economic terms.

That being said, our platform integrates:

- Consumption information (in real-time)
- Energy exchange metrics
- System balancing mechanisms
- Energy trading contracts
- External energy trading contracts
- Energy supply contracts

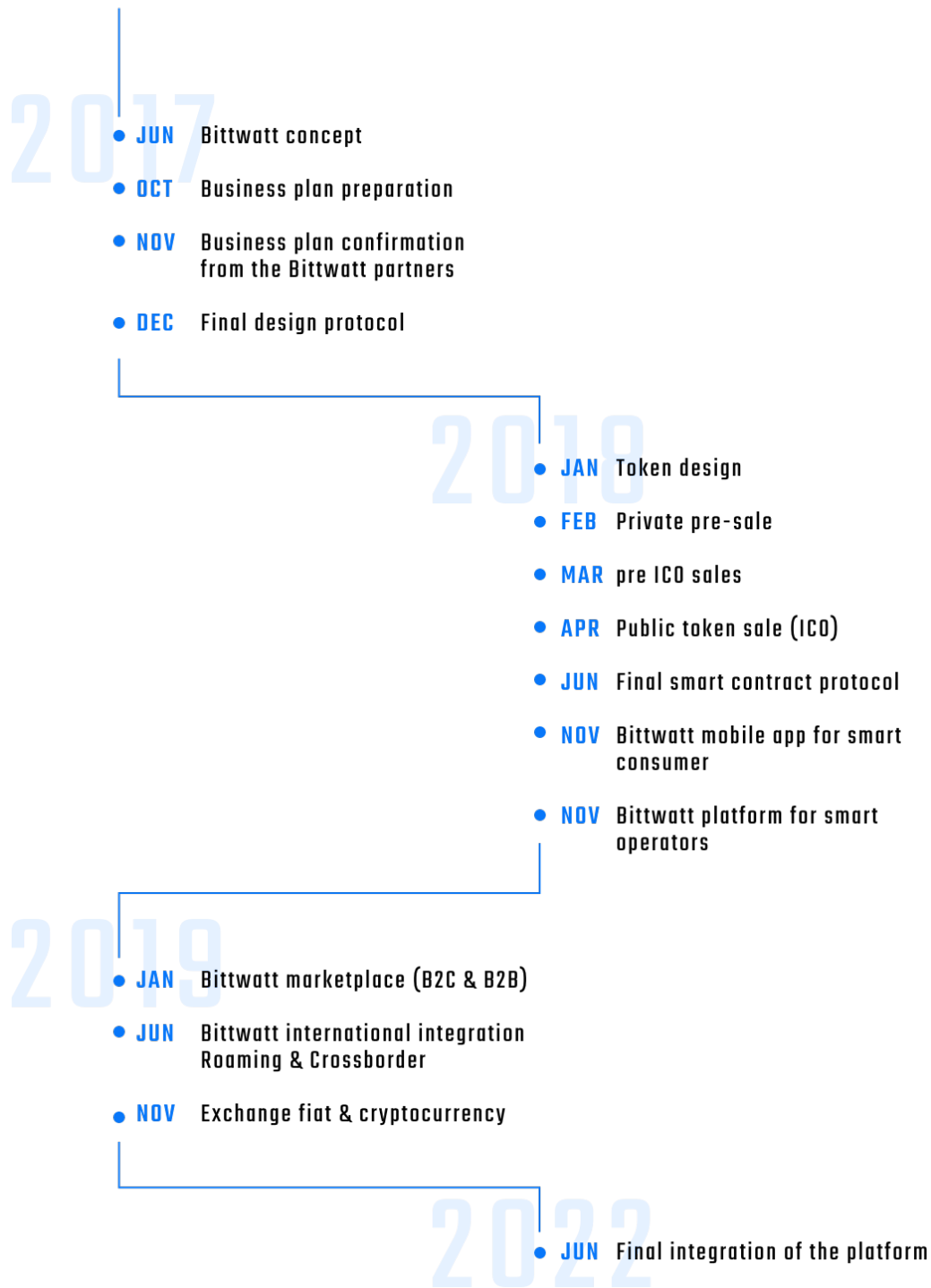
... into a blockchain that allows for instant adaptation to real-world conditions and requirements, for all platform participants in the system.

Uniting the aforementioned into a single, simple user interface is the major achievement of Bittwatt – and it is what brings added value as well as differentiation to our ecosystem customers and business partners. Time and time again, the world of industry has shown us that simplification and digitization of services people require regularly is the key to healthy and sustainable growth – and with that in mind, we have developed Bittwatt as a platform that does away with bureaucracy, reduces costs, simplifies the user experience all the while offering flexibility and responsiveness that outweigh any reluctance of the consumer to switch to our new design.



# Objectives and cashflow

## ROADMAP



## SALES FORECAST

Our expansion plan is based on opening offices in new countries, based on partnerships with local energy suppliers. Each country partner must meet two key requirements: that they own 1,000,000 BWT and that they have at least 50,000 customers. All other users must provide [standard KYC documents](#):

### DOMESTIC CUSTOMER

#### VERIFICATION

*ID,  
Point of delivery,  
Credit card check*

### INDUSTRIAL CUSTOMER

#### VERIFICATION

*Certificate of incorporation,  
Point of delivery*

### POWER PLANT

#### VERIFICATION

*Certificate of incorporation,  
Operational license*

#### OTHER REQUIREMENTS

*Smart meter on location*

### SUPPLIER

#### VERIFICATION

*Certificate of incorporation,  
Operational license*

### CHARGIN STATION

#### VERIFICATION

*Certificate of incorporation,  
Point of delivery  
Connectors type*

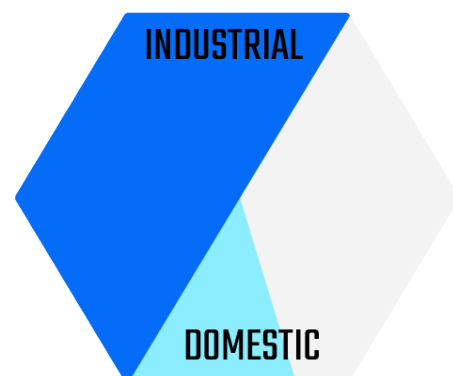
We foresee that by 2022 we will reach a total number of 15.8 million users with a turnover of 690 millions USD and 22% profit. Marketing opening forecasts:

Country	Opening the market	Estimated # of customers
China	2022-Q1	5.0
Russia	2021-Q3	2.0
Moldova	2021-Q2	0.1
Netherlands	2021-Q2	0.9
Denmark	2021-Q1	1.0
Norway	2021-Q1	1.0
Sweden	2021-Q1	1.2
Portugal	2020-Q2	0.3
Spain	2020-Q1	0.4
France	2019-Q4	0.8
Italy	2019-Q3	0.7
Germany	2019-Q2	1.2
Austria	2019-Q1	0.3
Hungary	2018-Q3	0.1
Ukraine	2018-Q3	0.2
Turkey	2018-Q2	0.5
Bulgaria	2018-Q1	0.1

## INCOME

Company incomes are projected to be from, and composed of:

- Estimated income (\$):
  - Domestic: 0.48\$/month
  - Industrial: 12\$/month
- Balancing Income (\$): We foresee 3% of total traded quantity by suppliers, producers and traders. At a minimum of 50,000 consumers, this will generate a monthly income of 36.000 \$





# Founders

## **Christian Haggmann**

*General manager & Co-founder*

Christian Haggmann has more than 20 years experience in the energy sector, performing roles as varied as entrepreneur, researcher, consultant – and even producer for a TV show called “Energy Backstage”. As an entrepreneur he worked on designing dedicated IT solutions for power grid management systems, debuting with a fault and network management solution for Vienna’s power operator. Since then he has started his own business and built many IT power solution from the ground-up, and starting from 2012 he has expanded operations into Eastern Europe where he provides services for smart network implementations, network automation, research, as well as power and gas supply. His strategy is to always be moving forward and continuously be working on improving from the status quo. In recent years he has branched out focus to include blockchain technology, and in 2017 he was part of the advisory team for Coss ICO. At the same time, he started developing Bittwatt, his most recent and most ambitious projects.

## **Daniela Cristina Stoicescu**

*CEO & Co-founder*

Daniela works as General Manager of a group of companies which primarily offer energy supply services for domestic and business consumers, with an annual turnover of over \$30M. Having an IT background, she has lead the development and implementation of several IT solutions for national power distribution and transportation networks, with projects such as Outage Management System, Virtual Power Plants and Smart Grids, and many others. She has since seen entry into the world of blockchain as a natural evolution, and is currently working on adapting all her projects to this new technology.

## **Adrian Asevoaia**

### *Project manager*

Adrian is an entrepreneurial manager, with over 10 years' experience of active leadership in fields such as financial markets, corporate lending, and portfolio risk management. He is a brisk adopter of new technologies within proven business models, and along with his demonstrated history as a Bank Branch Manager and Chief Financial Officer, Adrian has ample experience in the rationale, network, and business of energy trading.

## **Tudor Stomff**

### *ICO Manager*

Blockchain Advisor and Community Manager having been involved in over 20 ICOs to date, to name a few: STOX, COSS, Worldcore, Sureremit, and Pundi X - the largest Bounty by number of participants. Collectively, the ICO's with which he worked have raised over \$300M and the bounties gathered close to 100,000 participants. Tudor is also a Developer and currently runs Bountyhive.io - a platform which connects Bounty Hunters and ICOs.

## **Maria Cristina Banu**

### *Marketing Specialist*

Maria Cristina is a business consultant with over 10 years' experience in marketing and brand management. She has worked for global corporations in the FMCG and IT&C industries and runs her own consultancy company where she works with interdisciplinary SMEs to create, implement and scale winning strategies for her clients. Added to this, she is also a business coach with over 500 hours of training in marketing, advertising and PR, business strategy, and coaching - and supports executives and entrepreneurs in finding their way to success.

## Alexandru Ioana

### *Content writer*

Alexandru is a marketing consultant with focus and experience in the B2B IT market in Europe and North America. He has worked for several industry-leading companies pioneering artificial intelligence and machine learning - and has a multifaceted background in fields such as marketing strategy, product marketing, branding, and advertising.

## Marius Posa

### *Business Developer for East Europe*

Marius has over 18 years of experience in applying his technological and legal training in entrepreneurial activities. His work spans the management as well as growth of several businesses, as well as the development of innovative solutions. His firmest belief is that success comes from the blending of technical and moral support, and has applied this philosophy in his promoting of research and application development in the energy sector, whereby he has constantly strived to bring about tomorrow's technology to today's consumer.

## Iulian Bobes

### *Research and development officer*

Iulian is a senior software developer with over 9 years' experience in web and application development projects. His experience spans various fields (such as life sciences, energy, financial, to name a few), and goes from database design and backend development all the way to frontend work. He is always looking for new technologies, and is eager to apply them to the projects he is involved in.

# Definitions

**Power plants** feed electricity and gas into the energy grid.

**Suppliers** buy large quantities of energy from the producers (power plants) and offer adapted products that meet the requirements of industrial, commercial and residential consumers.

**Consumers** buy corresponding products from the suppliers. However, consumers can also supply energy, in which case they act as prosumers who not only feed electricity into the grid, but may also participate, to some extent, in the grid control process.

**Traders** buy energy from producers, traders or suppliers on the wholesale market and resell it to other traders or suppliers. The wholesale energy market is a pan-European marketplace where some products are resold several times before finally reaching the consumer through a supplier.

**Energy exchanges** offer a marketplace where electricity and gas can be traded. These marketplaces are heavily regulated, are monitored by national regulators and some even have a special status in that they carry out certain functional processes with network operators.

**Clearinghouses** are usually connected to one or more exchanges and carry out the financial and physical settlement for energy transactions.

**Brokers:** Traders are not forced to do business exclusively through energy exchanges; the European energy market also hosts a large number of brokers offering platforms that traders can use for their transactions.

**Index agencies** are institutions that establish market prices for energy products, either on trading platforms or by contacting individual traders, and provide pricing information to traders in exchange for fees

**Standardization bodies** stipulate the processes of energy trading. In particular, for the European market, the EFET<sup>8</sup> is to be mentioned, as well as the ENTSO-E and ENTSO-G, the TSO associations of electricity and gas, who agree on grid-relevant processes.

**Regulators** monitor the energy market at the national or European level. Their technical connection covers the reporting of transactions by the parties involved.

# Company Ownership / Legal Entity

**Bittwatt Pte. Ltd.** is a private company incorporate in Singapore under the Companies Act, on and from 13/10/2017 and the company is an Exempt Private Company Limited by Shares.

**U.E.N : 201729551Z**

**Address: 22 North Canal Road,  
Singapore**



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