Dokdo Renewable Energy

DOREN

Whitepaper 0.2.1_EN

Decentralized
New Reneable Energy
Integrated Monitor Mediate Project

Transparent **R**eliability
Rationality **P**rofitability

Introduction

Paris Agreement was adopted by United Nations Framework Convention on Climate Change (UNFCCC) in 2015. It was adopted on 12 December 2015, the closing date of the Conference, and became effective as a comprehensive international law from 4 November 2016. Conference organizer Laurent Fabius, the French foreign minister, called the plan "an ambitious and balanced" a "historical turning point" in global warming.

It is an international agreement to maintain the global average temperature increase width below 2°C compared to before industrialization and further to limit the temperature increase width below 1.5°C. Countries should set their own goals for reducing greenhouse gas emissions and promise the international community to implement them, and the international community will jointly verify their implementation. The Paris Agreement was unanimously adopted by 195 countries at the 23rd General Assembly on Climate Change in 2016. Despite the U.S. declaration of withdrawal in June 2017, more than 200 countries, or 87% of the world's carbon emissions, are still implementing the agreement.

New renewable energy is the most related industry to the survival of mankind created in line with this global trend. To overcome the global environmental crisis caused by existing fossil fuels, the DoRen Foundation will start a transparent and reliable new renewable energy project that points to problems in the renewable energy industry and combines blockchain and big data technology.

Table of Content

Ⅰ DoRen Project Summary

The DOREN project is a decentralized energy project to mediate and trade transparent and reliable content using blockchain technology for new renewable energy data produced at small power plants at a national level. The DOREN platform includes blockchain systems and big d ata technologies to solve problems in existing centralized energy systems.

In the case of the spread of new renewable energy, it is not a business policy of some countries, but a global expansion area. From the 2nd and 3rd Industrial Revolution until the 2000s, fossil fuels such as oil, coal, nuclear power and etc., which were traditionally produced and consum ed, were inevitable sources of consumption to generate electricity. However, as global warmin g, climate change, and environmental pollution caused by greenhouse gases became more s erious, new renewable energy using solar, wind, hydrogen, geothermal and bio has become a national challenge as Clean Development Mechanism(CDM) business. The CDM project is d efined as a greenhouse gas reduction project jointly promoted by developed and

developing countries through the Paris Agreement of 2015, and is a de-national project contr olled by the UN.

The new renewable energy policy is also in line with the ideology of blockchain, a key technol ogy for the DOREN project, as a de-national project. Blockchain is called a decentralized syste m (server). Currently, blockchain technology is still used as exchange and digital currency, but t he integrity and transparent data security management technology of blockchain and smart-c ontract technology are the most suitable technologies for real business.

Blockchain technology of DOREN project, like the new renewable energy business, is a princ iple that gives node authority to small power generation resources that contribute to new rene wable energy generation based on Proof of Stake(POS), and discards the existing blockchai n consensus algorithm, POW (Proof of Work), which excessive energy consumption and non-ecofriendly. This presents a win-win basis for both the foundation, the plant (node), and the in vestor (DRE holder), based on the DOREN Foundation's sustainable eco-friendly project app roached in terms of business.

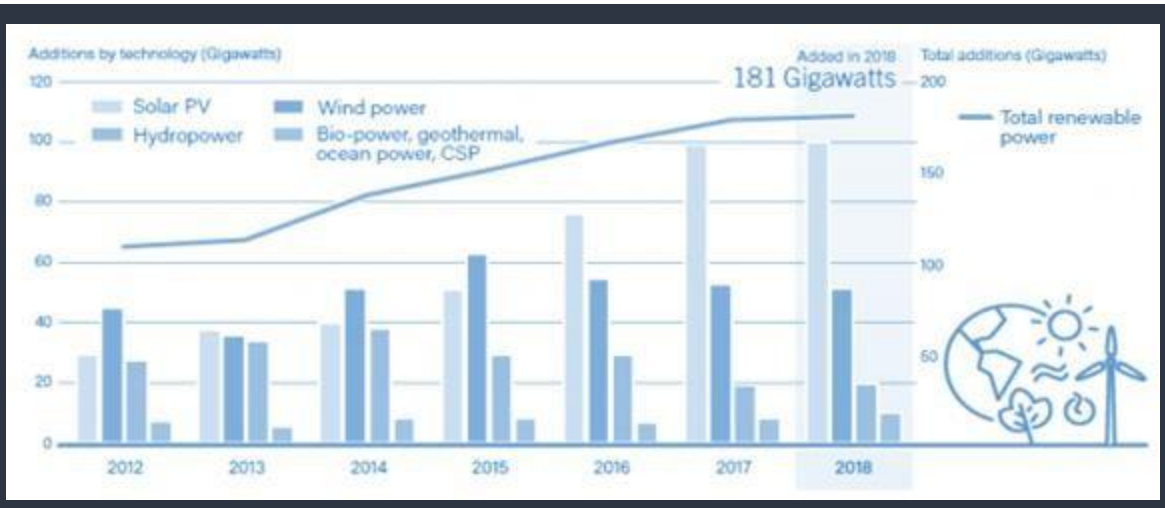
The DOREN project does not stop only with these transparent and reliable new renewable en ergy control and mediation services, but independently conducts hydrogen fuel cell energy g eneration projects with high cost-effective eco-friendly energy production. This is to eliminate t he uncertainty of revenue that may arise if the business is carried out only as an intermediary business, and the ambiguity of revenue payments from mining nodes and holders.

In particular, in Korea, new renewable energy is the most prioritized business category in gov ernment policy, which is advantageous in securing additional funds and generating additional profits. Under the Government's Renewable Portfolio Standard (RPS), it is mandatory to sup ply new renewable energy only for businesses that generate more than 500,000 KW of electri city. It is a compulsory provision to supply renewable energy. Therefore, small power plants c an produce new renewable energy and trade it with suppliers, which is called a Renewable E nergy Certificate (REC) trade. This is directly profit beneficial to all power plants and resources that produce renewable energy, and furthermore, if registered and certified by the United Nati ons Framework Convention on Climate Change (UNFCCC), it can expand into a de-national business.

The DOREN project plans to operate a blockchain-based integrated energy control and medi ation platform through the category of renewable energy focusing on the global situation, and continue to expand profits through the production of hydrogen fuel cell energy. From now on, t he foundation will launch a full-fledged project with a team with related expertise.

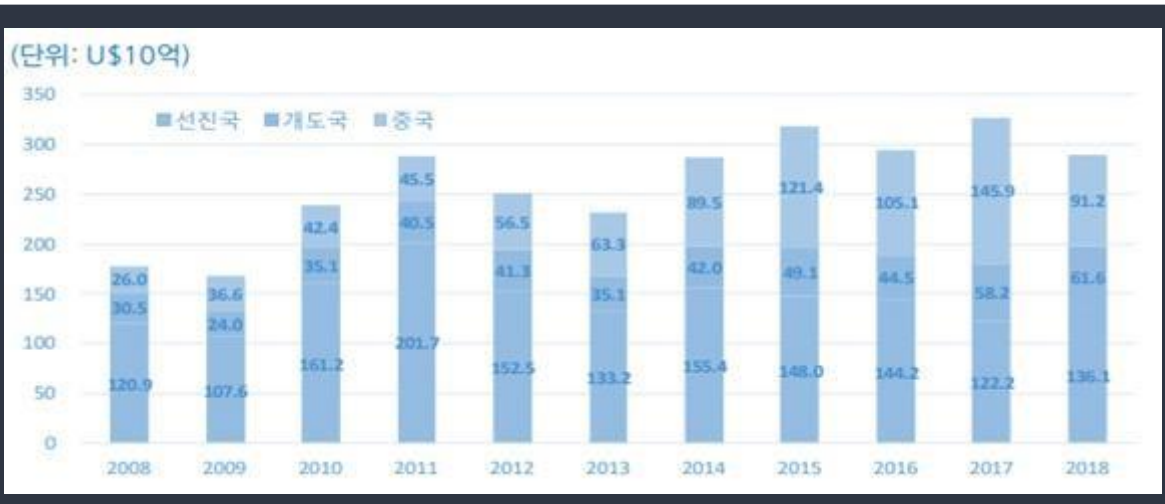
Ⅱ Market Analysis

2-1 Spreading Global New Renewable Energy Market



< 2019 Renewable Energy Policy Network for the 21st Century >

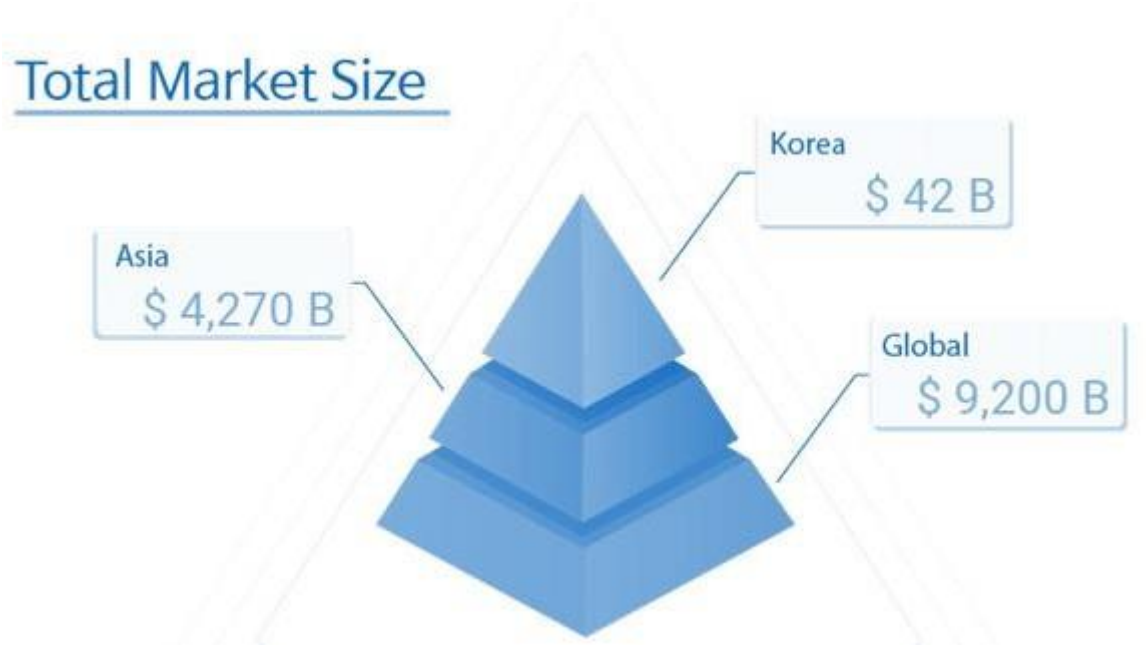
Since 2012, new renewable energy generation and supply have continued to increase amid the spread of the trend of conversion to clean energy to reduce greenhouse gas and air poll ution around the world. From 2012 to 2018, the market growth rate increased by an averag e of about 8% per year. As of 2018, generation volume analysis by energy shows that solar energy accounts for an overwhelming proportion of solar energy with 100 GW (55%), wind power 51 GW (28%, including offshore wind power 4.5 GW), hydro power 20 GW (11%), and other 10 GW(such as bio). New renewable energy accounted for 33% of the world's power generation facilities, with a cumulative size of 2,378 GW, and China, which leads new rene wable energy supply and investment, ranks first in the world in hydro, solar and wind power. The United States ranks first in terms of bio and geothermal heat.



< 2019 IRENA International Renewable Energy Agency report >

Ⅱ Market Analysis

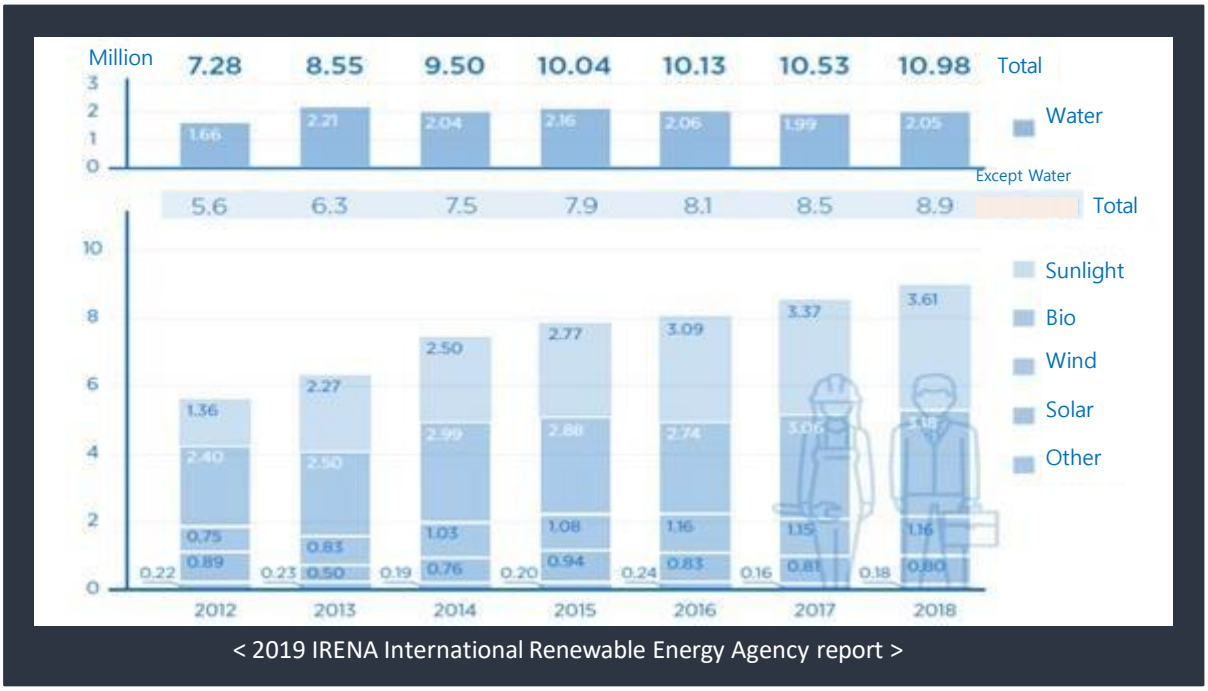
Its global investment in new renewable energy in 2018 is worth $288.9 billion. Global renewable energy investment reached its highest level with U$326.3 billion in 2017, with 47.1% in advanced countries, 31.6% in China, and 21.3% in developing countries (excluding China), while China, U.S., EU, Brazil and India are leading the investment. In particular, China accounts for about one-third of global renewable energy investment, and investment in developing countries has exceeded developed countries since 2015.



As of 2019, the global renewable energy total market is about $9,200 Billion, which is equivalent to the automobile industry market. Among them, South Korea is worth about $ 42 Billion, accounting for 0.5 percent of the global market. In Korea, the policy on new renewable energy generation/supply is weaker than in China and advanced countries, and it is still in its infancy in terms of facility investment. However, it introduced a mandatory RPS supply system in 2012 and announced a goal of supplying 11% of its primary energy to new renewable energy by 2030. Hydrogen fuel cell energy generation in Korea is currently in the blue ocean area, with a relatively low ratio due to new renewable energy focusing on solar and bioenergy. The high efficiency of hydrogen fuel cell energy and the reduction in facility costs are quite similar to the ideology of new renewable energy.

Ⅱ Market Analysis

2-2 New Renewable Energy Specialist Market Size



< 2019 IRENA International Renewable Energy Agency report >

According to the employment sector caused by the spread of new renewable energy, the number of people directly and indirectly engaged in the global renewable energy industry (including the Great Hydroelectric

Power) has steadily increased to about 11 million in 2018. New renewable energy jobs are concentrated in small countries. The proportion of jobs in Asian countries is 60 percent, with China (4.08 million), Brazil (1.13 million), the United States (860,000), India (720,000), and EU countries (1.24 million). By energy, 3.61 million people are employed in the solar industry, accounting for about one-third of all jobs. The spread of renewable energy has a direct impact on job creation.

Ⅲ Challenges

3-1 Integrated control & forecast limits of energy for small power plants

In Korea, the capacity of small distributed resource generators to trade offsetting has been ex panded from less than 5KW in 2005 to 1MW in 2016 as part of the upgrade of new renewabl e energy facilities/development. In order to expand the prosumer business, the remaining ele ctricity can be sold to KEPCO after offsetting. However, there are not many brokers currently conducting power brokerage for small power resources and integrated control for 24-hour mo nitoring compared to the increase in small power resources, and most of them are sunlight(so lar)-oriented energy brokers.

In particular, in the case of small private power plants, the amount of surplus outstanding elec tricity is increasing every year, which is like an energy loss. In addition, integrated control is re stricted due to the difficulty of predicting the overall generation of renewable energy in Korea. In Korea, while compensation rules for improving efficiency have yet to be prepared, only eig ht out of 40 companies registered as power brokers have engaged in transactions in 2019, w hich is why their actual business performance is so low.

3-2 Lack of overall data reliability for energy generation / storage / trade

The current energy industry has problems from the time of generation and production. All data is stored on a centralized server and data is moved to the power exchange by the server ad ministrator. This is the biggest security problem in which power generation and production his tory by insiders can be hacked. Energy data is highly vulnerable to manipulation by third parti es and is a system with limited recognition of revenue relative to real-time power generation f or generators (suppliers). There is also a problem with power trades. This is a ledger compari son between producers (suppliers) and consumers to check demand data, which is crucially an environment in which data leakage or contrast errors can occur at any time by manually c hecking power transactions by humans.

Since energy data generated from each power plant or small power source and the history of power generation facilities are the most important sections of the industry, transparent or unre liable data are the first tasks to be solved at this point.

Ⅲ Challenges

3-3 Intensification of asymmetry in info by country on global CDM policies

Although CDM is being carried out by the United Nations Organization (UN), it is not easy to obtain accurate information such as CER and energy business conditions as a national unit. Currently, policy information and energy policies of each country are so different and diverse in the era of data flooding that it is very limited for operators to study and enter into industry. If we build and provide a platform that can provide standardized information in one place and o rganize a wide variety of information in one category of renewable energy, this is also a great g lobal achievement.

IV Solution

4-1 Transparent and reliable integrated energy control based on blockchain

Energy blockchain is a power control and mediate trading system that records all of the core data of producers-suppliers-ESS(Energy Storage)-traders storing in blockchain to share the transaction details to distributed ledger, serving as the final transparent P2P power trade. Bec ause everyone becomes a supplier and a consumer, trades are easier and trade costs are red uced. This is because energy itself is exchanged online rather than making physical trades wit h documents or currency. In energy trading using blockchain, energy supply is efficiently act ivated as energy can be freely traded regardless of the concept of suppliers and consumers. In addition, various energy data collected in blockchain can help identify energy demand. En ergy waste can be prevented by allowing consumers to supply and trade as much energy as they need. These advantages can be actively utilized for small distributed power trade. In mi cro-grid, which independently produces and supplies renewable energy to consumers, it ca n be applied as a way to supplement renewable energy with inconsistent power generation. In other words, energy blockchain technology enables stable and transparent power to provide m ore cost-effective energy.

IV Solution

4-2 Expanding Small power generation energy usage and revenue business

Various renewable energy generation businesses are emerging under the domestic renewable energy 3020 policy. The representative business is the number of small power plants such as solar power plants is rapidly increasing. However, due to the absence of an efficient data inte gration monitoring center for small power generation resources, there is no suitable platform f or processors of smooth energy generation, storage, supply and trade to operate normally. T his small power generation takes the form of various power plants. This may be a common fo rm of power plant, but this includes ESS cars, residential solar power, and local power gener ation energy. New renewable energy generates additional profits for both producers and brok ers through the trade of System Marginal Price (SMP) and Renewable Energy Certificate (RE C).

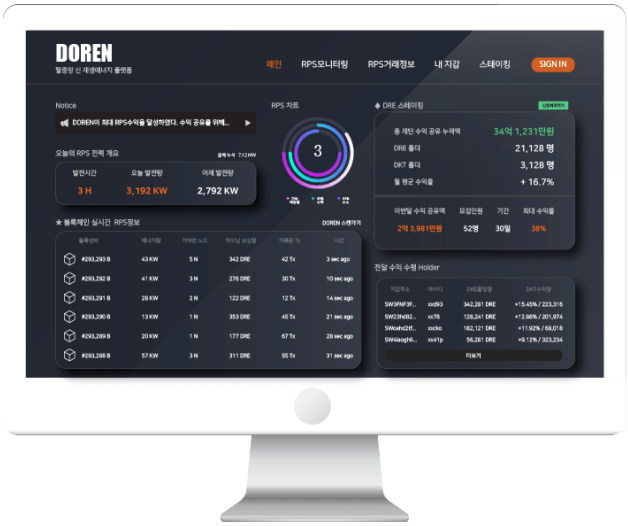
If these energies are integrated monitored 24/7 in one place and facilitates mediation trades, they can bring profits to both producers (suppliers) and consumers. The platform, which cheri shes even small energy, can bring profits from both sides, and it is a strategy that can co- exist with brokers who act as prosumers by utilizing it.

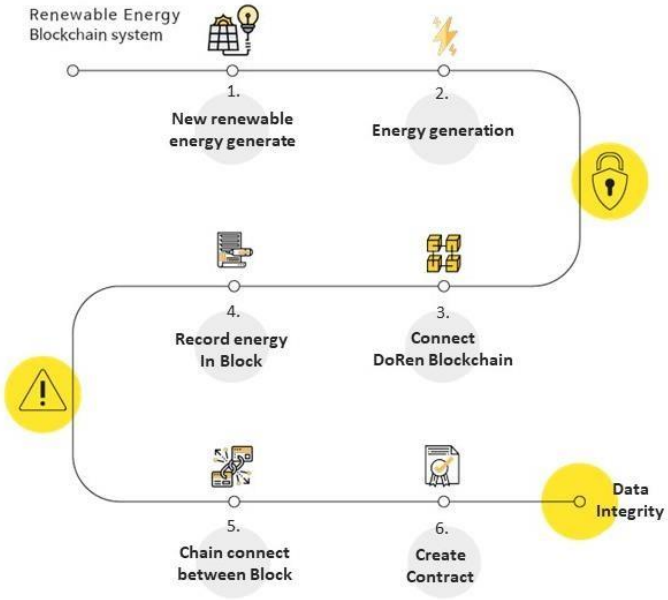
4-3 Community to provide asymmetric information integration

In order to become a pan-national platform, overwhelming information power must be suppor ted in the energy industry. The problem of information asymmetry is solved if the energy industr y policies of each country are standardized in one place. Global standards should form all inte grated communities related to renewable energy by providing information on the United Natio ns Framework Convention on Climate Change (UNFCCC) and standard information from each country's renewable energy management bureau. This may be aimed at providing fast and c onvenient services by significantly lowering entry barriers to the carbon footprint (CER) area f or small power generation operators.

V DOREN Platform

5-1 Transparent, reliable data processing integrated solution based on blockchain





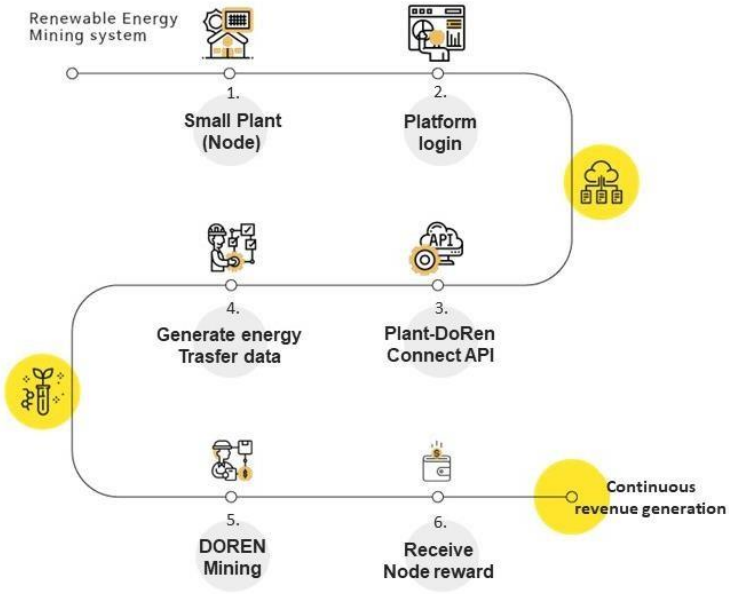
The DOREN platform demonstrates the integrity of the data by real-time recording of facility information, power generation information, anomaly alarms, storage information of ESS storage devices, and power transaction information of traders and CDM in the blockchain. That is, all content information in renewable energy ensures transparent and reliable transactions, abandoning the 1:1 comparison of central systems and providing a clean energy data trade 24 hours 365 days.

Generate Info	ESS Info	Trade Info	CDM Info
Facility Info Facility Contract Info Facility event Info Facility maintenance Admin history Info Generation Generation event Info SMP Info	Storage History Transmission History Settlement History Facility check History Issuing payment Payment Info Fee Info Payment settlement Info	Standard contract Info Winner Info Issue target/facility Info Apply/Issue Info Request/Calculate Info Payment Info Fee Info Ownership Info	Reduce certificate Info UNFCCC certificate Info CER trade Tx Info

< Energy Contents record in DoRen Blockchain >

V DOREN Platform

5-2 Mining solutions for small power generation that generate energy



The DOREN platform abandoned the existing blockchain proof of work (POW) method and developed its own proof of energy production "POE (Proof of Energy)." Inefficient and high-energy consensus algorithms such as Bitcoin and Ethereum stand on the opposite side of the ideology of renewable energy. Therefore, the DoRen Foundation applied high efficiency/low cost eco-friendly blockchain technology through its own special blockchain algorithm. All power generation resources that produce new renewable energy form an ecosystem by linking their power to the DOREN platform. In addition, DRE tokens are provided by smart contracts with reasonable mining rewards through real-time power generation measurements on ecosystem contributions. The mining volume of small power resources is half-life every five years and is determined by the calculation formula below, but changes in the calculation formula occur continuously depending on the additional environmental factors and coefficients.

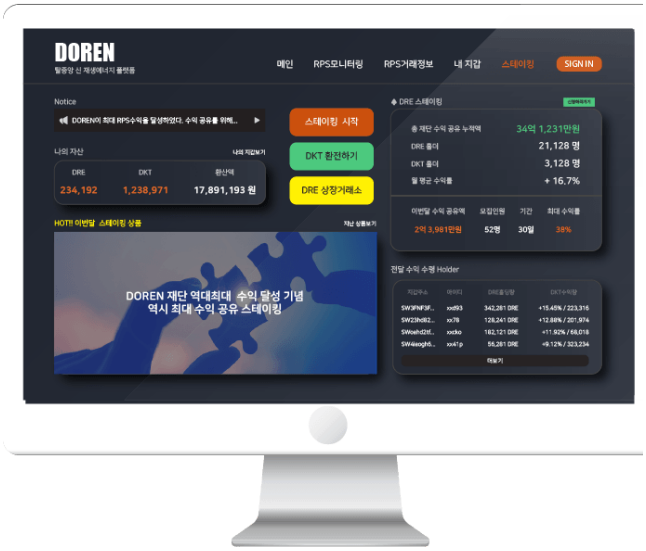
< POE Consensus Algorithm Mining per Small Power Resource>

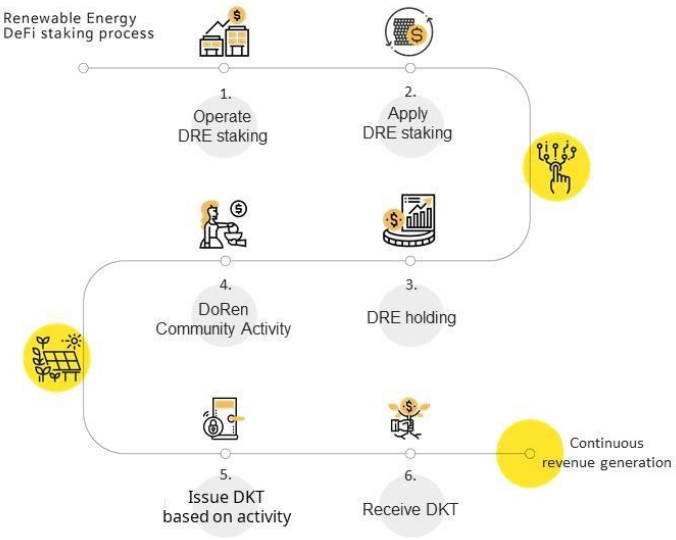
[Reduced CO2 compare generation + (Time X DRE Holding) + Trade Times] ÷ Total mining per session / Nodes

Each minor can exchange DRE tokens mined on the DoRen platform on listed exchanges, and regularly obtain tokens through DoRen DeFi staking products. In addition to revenue as a minor, it can also be extended as a sustainable business through basic SMP and REC trades.

Ⅴ DOREN Platform

5-3 Staking Solution for DRE Holder





The DOREN Foundation supports the DoRen DeFi Staking solution for DRE holders to partic ipate in, and the participation method is as follows.

Ⓒ DRE holders apply for participation in solutions within platforms.

Ⓒ Stake the DRE according to the quantity requested for participation in the solution.

Ⓒ In order to revitalize the community sharing the information and news related to renewable energy in the platform.

Ⓒ As compensation for platform activation, DKT, which is a stable token, is obtained.

In addition to participating in the above solutions, platform participants can also acquire DRE as a variety of fees for REC brokerage, SMP brokerage, etc. by participating in brokerage sys tems that proceed within the platform.

Ⅴ DOREN Platform

5-4 P2P Trading Solutions for Global Integrated Energy Trading (SMP/REC)

The DOREN platform follows the corresponding fundamental ideology between blockchain an d renewable energy, "de-national" and "de-central". New renewable energy content in all bloc kchainized processes is valued as a currency in itself. It will significantly lower traditional exc hange-based transaction fees and development resources earn SMP revenue equivalent to wholesale prices. It also simplifies administrative needs through REC trade support and supp orts fast power supply for the demand.

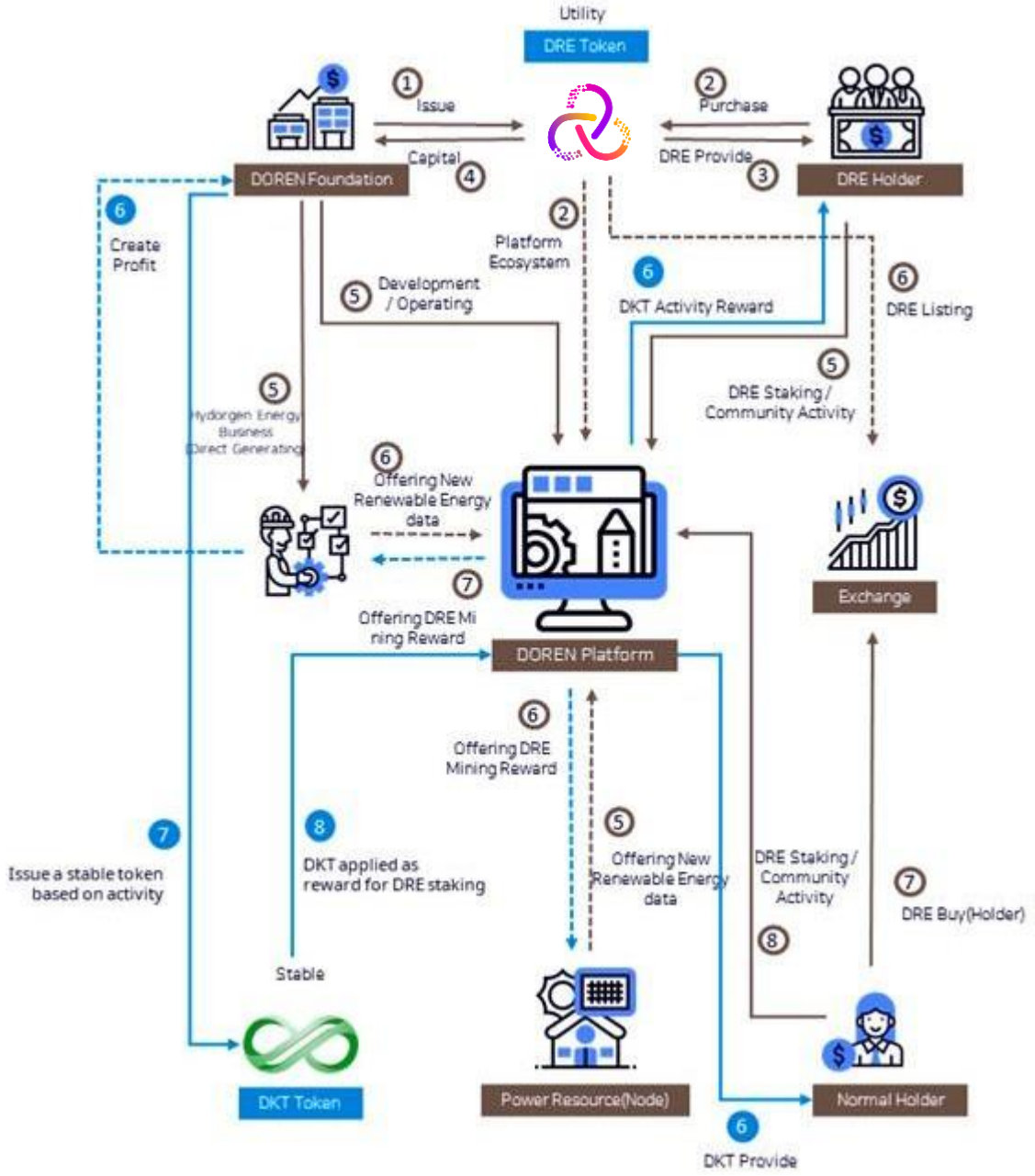
5-5 Policy / News / Related Information Standards Integration Solution

The DOREN platform aims to be a global community of new renewable energy integration. By providing standard information on UNFCCC and national policies and news, acquisition use rs of platform can be naturally and explosively increased. The handling of this energy standar d information can also provide a lot of support for national and language integration policies, and furthermore, the creation of one category, renewable energy. In addition, it will be a activi ty force for countries that lag behind the new renewable energy policy by comparing contents on national support.

5-6 Leading a mining donation culture for children in developin g and poor countries

The DOREN platform aims to continue to donate some of the foundation's profits and assets for those suffering from environmental and natural difficulties around the world with the ideolo gy of cleanliness of renewable energy and transparency of blockchain. A certain percentage of the mining quantity of small power resources (nodes) shall be accumulated as donations a nd foundations for international volunteer activities, and shall participate in international volun teer support activities such as water shortage countries' well construction projects and school establishment. This solidifies its position as a global social enterprise by participating in future -oriented and active international activities by the DoRen Foundation, not in urgent business a nd profit activities.

DOREN Platform Operating Process



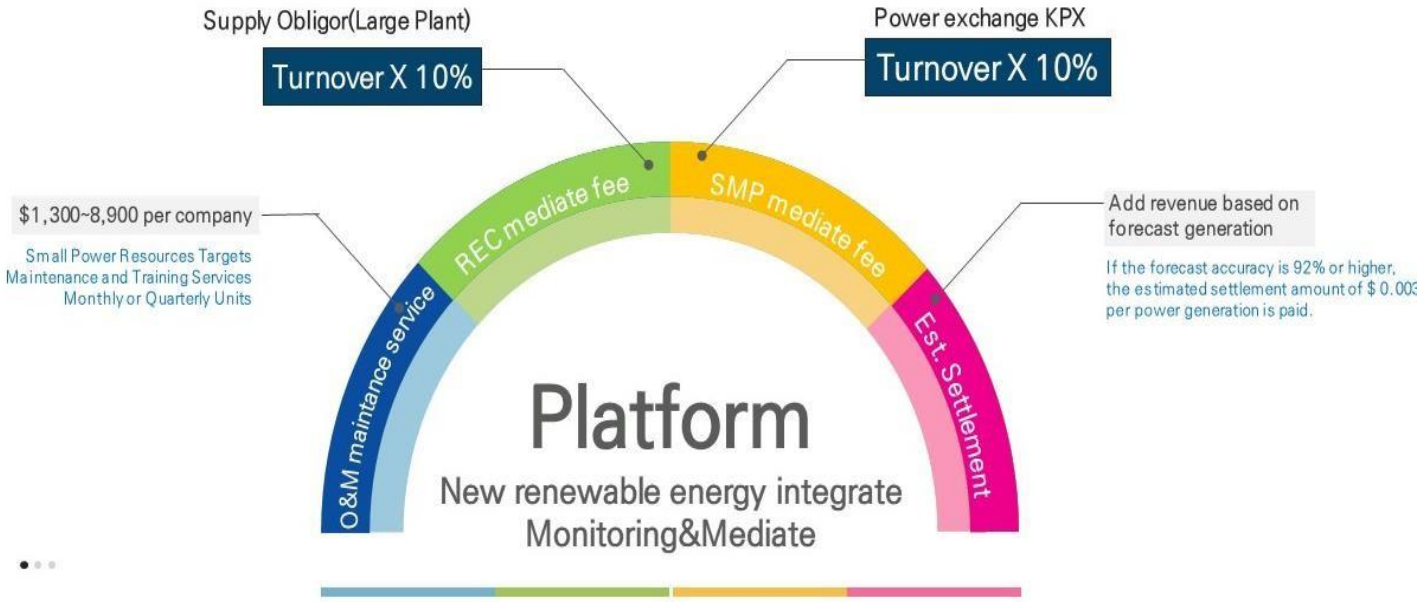
VI DOREN Business Model

6-1 New Renewable Energy Platform Control & Mediation Business

First source of revenue

Small power resource mediation and maintenance

- REC Trade Mediation Fee: Supply Obligor – DOREN – Small Power Resources
- SMP Trade Mediation Fee: Power Exchange – DOREN – Small Power Resources
- O&M Maintenance Service: DOREN – Small Power Resources
- Estimated settlement amount: DOREN – Power Exchange (KPX)



VI DOREN Business Model

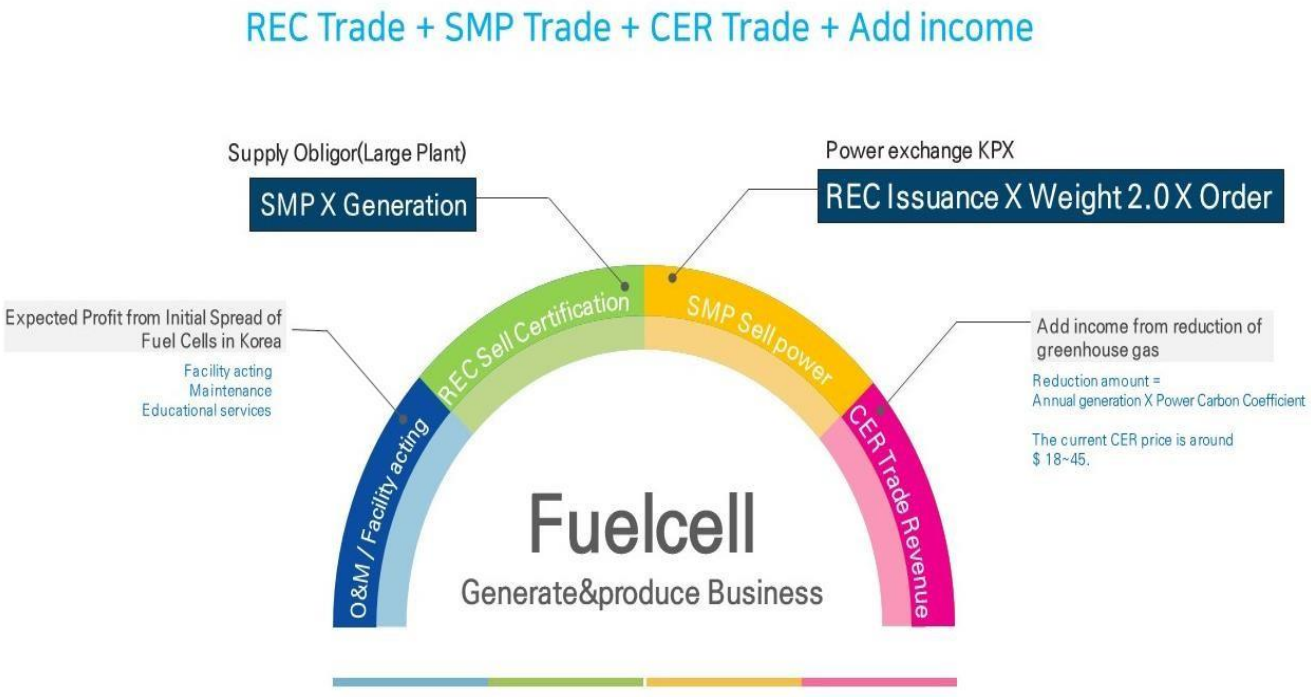
6-2 Fuel Cell Energy Generation and Supply & ESS Business

Second source of revenue

Fuel cell energy generation production

- SMP Power Sales: (SMP by Time X Generation) – [Power Trade Fees + VAT (10%)]
- REC certified sales: (REC issued volume X weight X traded price) – [issue fee + VAT (10%)]

  * The REC weight of hydrogen fuel cells is higher than other renewable energy such as solar energy.
- Carbon emission rights (CER) business revenue: Electricity can be sold under approval of business license through UNFCCC
- Other revenue: Additional profitable on hydrogen fuel cell power plant O&M, plant facilities, etc.



Ⅶ DOREN Customer Acquisition Strategy

※ Keywords ※

Integrate small power resources 24 hours 365 days monitoring
Integration of surplus power, demand forecasting technology, ESS data interworking
Gain load-varying response skills
On/off durability, extended operation range, optimized control technology
Decentralized P2P Power Transactions Spread
Blockchain energy data trading technology, smart contract optimization, TPS acceleration
Securing hydrogen production unit price reduction technology
Improve efficiency, reduce capex, optimize control technology

Ⅷ Issue DOREN duplex cryptocurrency

The DOREN Foundation issues a dualized token to apply the real business of cryptocurrency, which used to stay only on existing exchanges. It issued a double token of the exchange listing and volatile utility token DRE (short for Dokdo Renewable Energy) and issued according to st aking and activity stable token DKT (short for Dokdo is Korea Territory) issued according to th e foundation's profits. This guarantees transparent and reasonable returns for DRE holders a nd brings together the growth of the DoRen project.

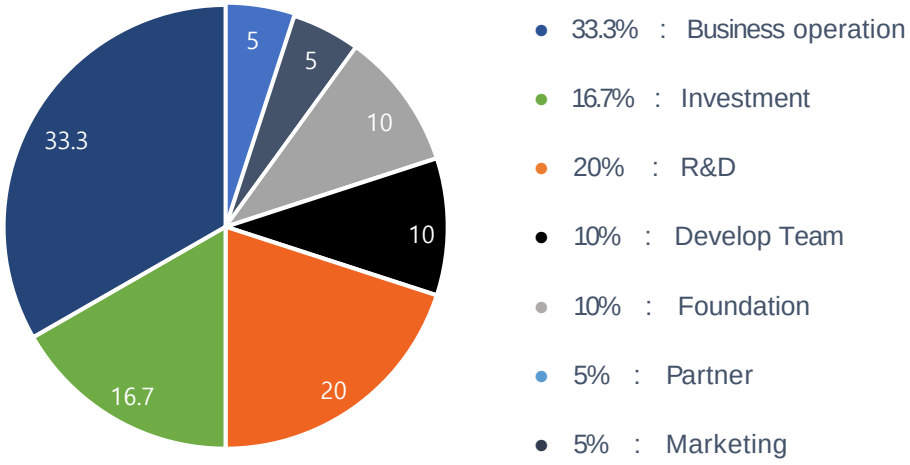
DRE Token

- Total issue : 9 Billion
- Character : Utility
- Mainnet : ERC20
- **Mining : 8.8 Billion / 97.78%**
- Sale : 0.2 Billion / 2.22%

DKT Token

- Total issue : Monthly issue
- Character : Stable
- Mainnet : ERC20
- Issue Terms : mining for staking+community activities
- Price : 1 USD / per

DRE SALE Allocation (2.22%)



IX Roadmap

2023

Maximizing Foundation Revenue Business
-Expand O&M Business Area Independent
-Monitoring the full range of renewable energy

2022

-Expand fuelcell energy revenue
-Expand hydrogen fuel energy facility
-Decentralization ESS Storage Data

2021 3Q

-Upgrade CER function
-Upgrade SMP/REC mediate function
-Transition DOREN independent mainnet Operating Staking function

2021 1Q

-Release DOREN dApp
-Fuelcell Energy Facility
-Mediate Sunlight-Fuelcell-Water energy
-Open DOREN wallet

2020

START

-Open DOREN project
-Attract Seed & Angel Investment
-Release DOREN Web platform
-Business promotion of fuelcell energy

Legal notice

This white paper is intended to be used as a reference for the introduction to the DOREN(Dokdo Renewable Energy) project. Therefore, this white paper only outlines information related to the DOREN project, and any purchase is made at the discretion of the individual following their reading of the entire white paper.

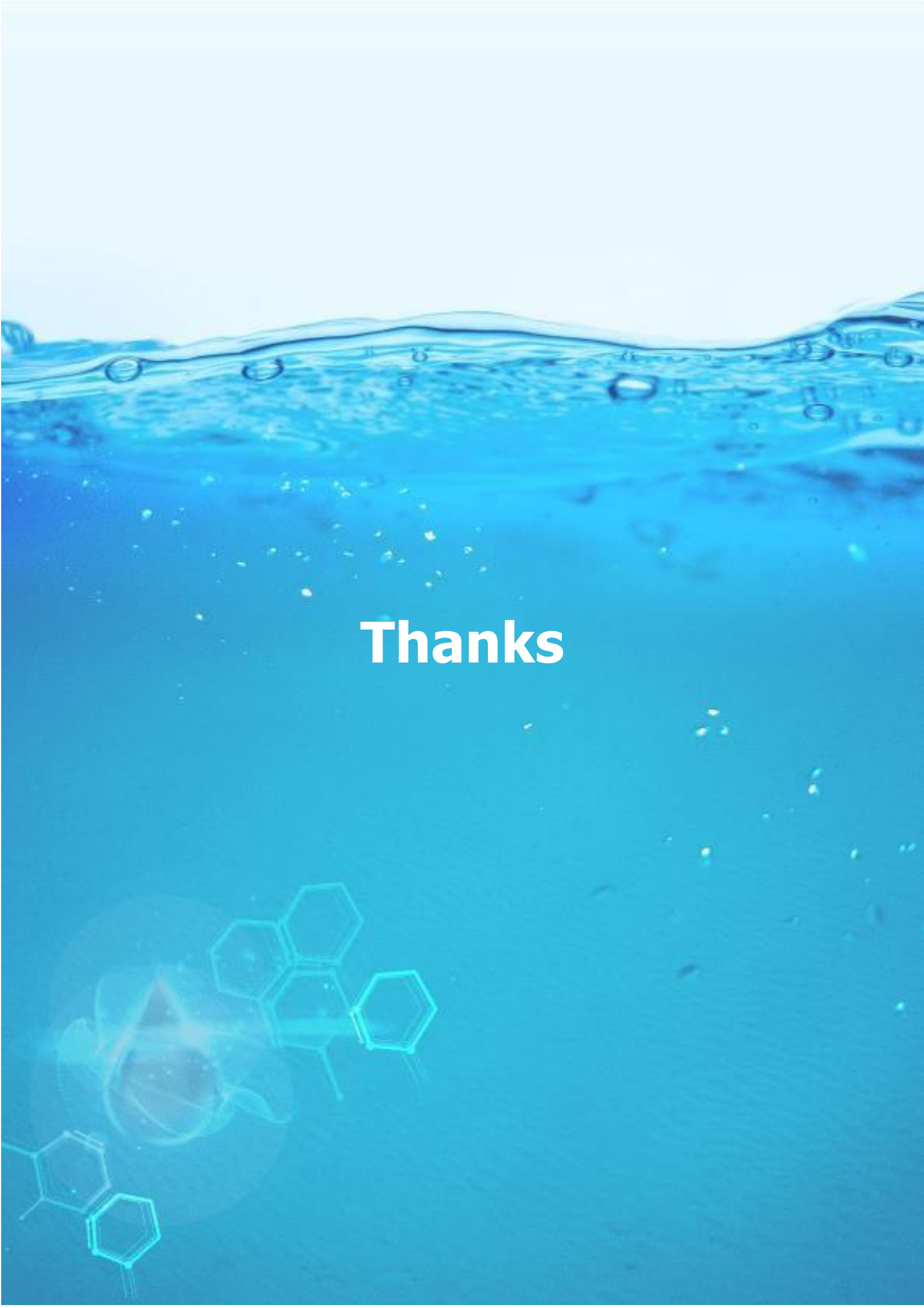
The DRE token and DKT token issued by the DOREN project do not give rights to any individual or interest group and do not have legal qualifications for security. DRE token has no performance or specific value outside of the platform it serves. DRE token should not be purchased or acquired for speculative purposes. Anyone purchasing DRE Token for purchase purposes should read this white paper carefully and understand all risks associated with the purchase.

DRE token holder must have a good understanding of cryptocurrency, and blockchain systems and services. It is therefore important to understand the potential risks which are associated with cloud investments and the mechanisms involved in use. The Foundation provides advance notice that it bears no responsibility for any loss of DRE token, loss of access to DRE token due to user behavior or carelessness, or for any attempt made by hackers to access illegally.

Acquiring and storing DRE tokens involves a variety of risks, especially the risk of failing to list on exchange or develop a blockchain system, resulting in no service being provided. Therefore, before acquiring DRE token, each purchaser must determine the risk of using it from a cloud sales perspective by yourself, and if necessary, seek appropriate expert advice. Acquire DRE token is not recommended if you do not accept or understand these risks or any other risks which are specified in terms and conditions.

This white paper has not been produced for the purpose of attracting investment. It is clear that this is not yet considered or related to securities under any statute. In addition, the white paper does not recommend attracting investment or contain direct details and information on purchase decisions.

DOREN Foundation


Thanks