PCRM
Whitepaper

Blockchain carbon reduction proof rewards to ensure sustainability of off-chain climate action **for everyone On-chain XTE WEB3.0 platform**

DATAM

Version 2.0

Escape Clauses

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Table of Contents

7. PCRM XTE WEB 3.0 ARCHITECTURE

8. PCRM XTE WEB 3.0 APIs

9. GOALs

10. PCRM Information

1. Summary

1. Summary

Background

The proof of new climate actions such as "carbon emission reduction", "environmentally friendly" and "low-carbon" lifestyles, along with a reward system based on them.

"Rewarding anyone through the WEB 3.0 platform
with carbon emission reduction certificates for climate actions."

The world as a whole, beyond individual nations, shares a common imperative to take decisive climate action. Humanity is facing the existential challenge of climate crisis, and there is an inevitable global transformation centered around SDGs (Sustainable Development Goals) that encompass carbon neutrality, ESG (Environmental, Social, and Governance), and RE100. We must clearly recognize our mission at the forefront of this transformation, and understand what we need to prepare and how we should act for ourselves and future generations. It is crucial to move beyond limited policies driven by specific countries and major corporations, as climate change adaptation confined to certain nations and large companies will pose even greater risks to industries and individuals alike.

The future direction of climate action will involve aligning with the policy framework of the United Nations Framework Convention on Climate Change (UNFCCC) and identifying global leadership models that go beyond the national greenhouse gas reduction targets (NDCs) of each country to pioneer current and future carbon-neutral industries. It will be crucial to accumulate carbon reduction assets through the discovery and dissemination of global leadership models based on practical baselines across industries, from individuals to the broader sectors. This should be accompanied by the development of carbon reduction consulting expertise, fostering innovative climate technologies, and exploring real-world case studies and business models that incorporate Measurement, Reporting, and Verification (MRV).

In the existing blockchain ecosystem, where Cryptocurrency generated from blockchain operations has been a major concern, blockchain technology is now being gradually applied to various industries such as distribution, logistics, finance, entertainment, and more, with a focus on enhancing the efficiency of existing industries rather than being cryptocurrency-centric. The widespread adoption of blockchain technology extends beyond the secure financial environment and is being utilized in various fields closely intertwined with everyday life, leading to societal transformation. DATAM Ltd. aims to expand and advance the autonomous carbon emission industry based on its expertise in carbon reduction methodologies and patent-based carbon emission reduction certification. With the advancement of technology and the resulting generation of vast amounts of data, traditional economic boundaries between different sectors are breaking down, leading to the convergence of services and consumption activities in various industries. Through the application of technology, DATAM Ltd. seeks to establish a reward system for climate actions in daily life and promote the expansion and development of the autonomous carbon emission industry.

1. Summary

PCRM Philosophy

- This is a blockchain-based reward system for carbon emission reduction certificates, utilizing numerous patented concepts, for various validated projects related to global climate actions (UNFCCC CDM, SDM) and other innovative approaches.
- Through patented algorithms and advanced **MRV (Monitoring, Reporting, Verification)** technology, we aim to quantify the carbon reduction achieved through climate actions. By tokenizing valuable big data, we provide a sustainable ecosystem with a circular structure, contributing to the development of private-sector-led carbon reduction initiatives.

=

BIG DATA = Carbon Credit = **DATA** is **M**oney = DATAM

PCRM stands for the

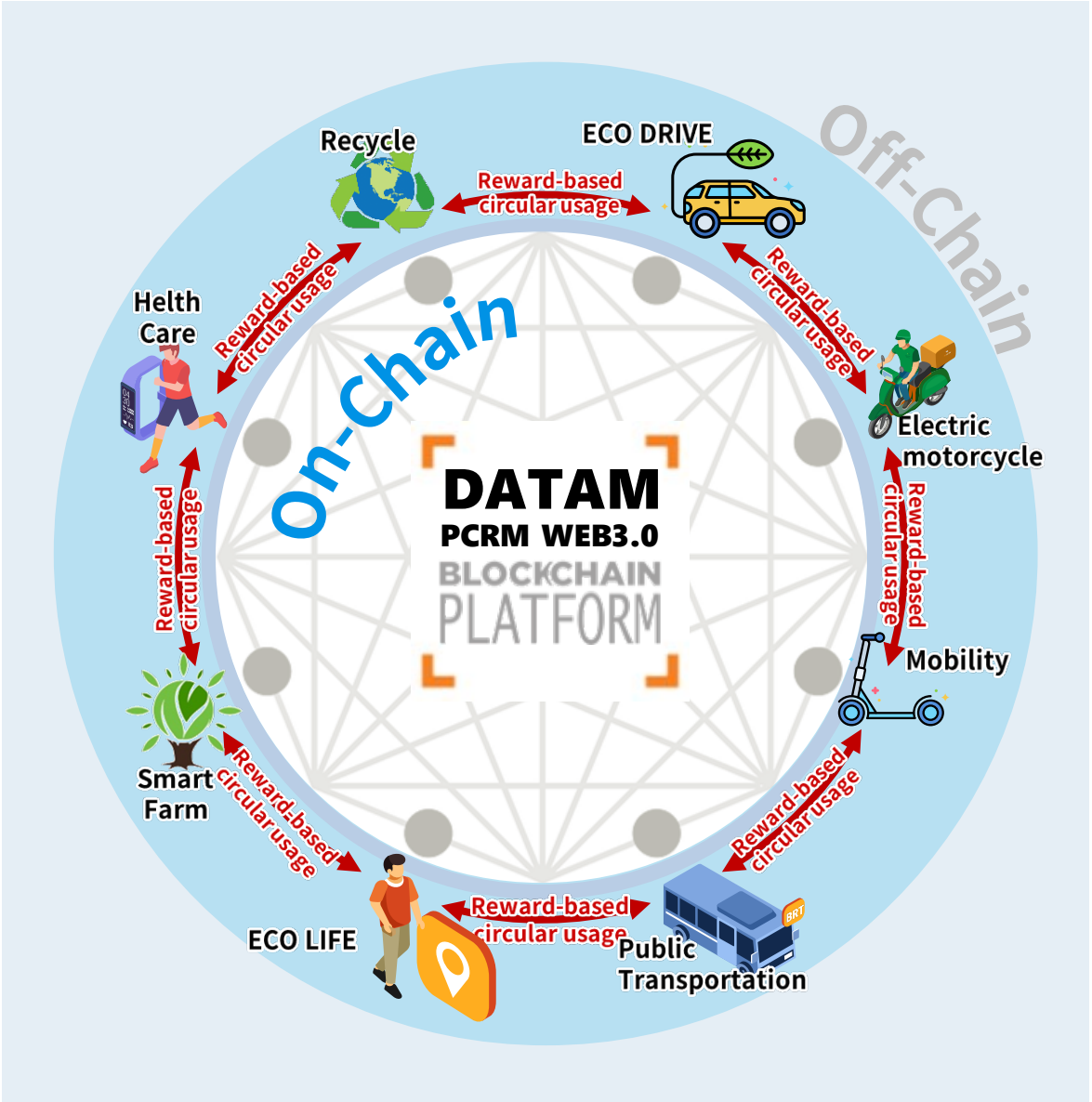
Proof of
Carbon
Reduction
Mining of Data

“
PCRM is a blockchain-based carbon offset certification that utilizes big data from MRV (Measurement, Reporting, and Verification) as the foundation for carbon reduction throughout the lifecycle.
”

1. Summary

Introduction PCRM

PCRM is a blockchain-based carbon offset certification that can be applied to economic and data production activities in various channels of the Multi {Channel, Contents, Commerce} Network. It can issue blockchain-based carbon offset certifications for areas where low-carbon climate actions are possible through the application of carbon reduction methodologies. Users participating in various events generated by users and stakeholders in each field will receive various benefits and access to a leading technological and service environment through the PCRM WEB 3.0 blockchain platform. The PCRM WEB 3.0 blockchain platform provides not only Payment Tokens, which are by-products of blockchain operations, but also Utility Tokens for carbon credits, convenient payments, security/authentication, and Smart Contract functionalities, offering users and businesses a new lifecycle and ecosystem.



1. Summary

Market Status

Use of fossil fuels and global greenhouse gas emissions status

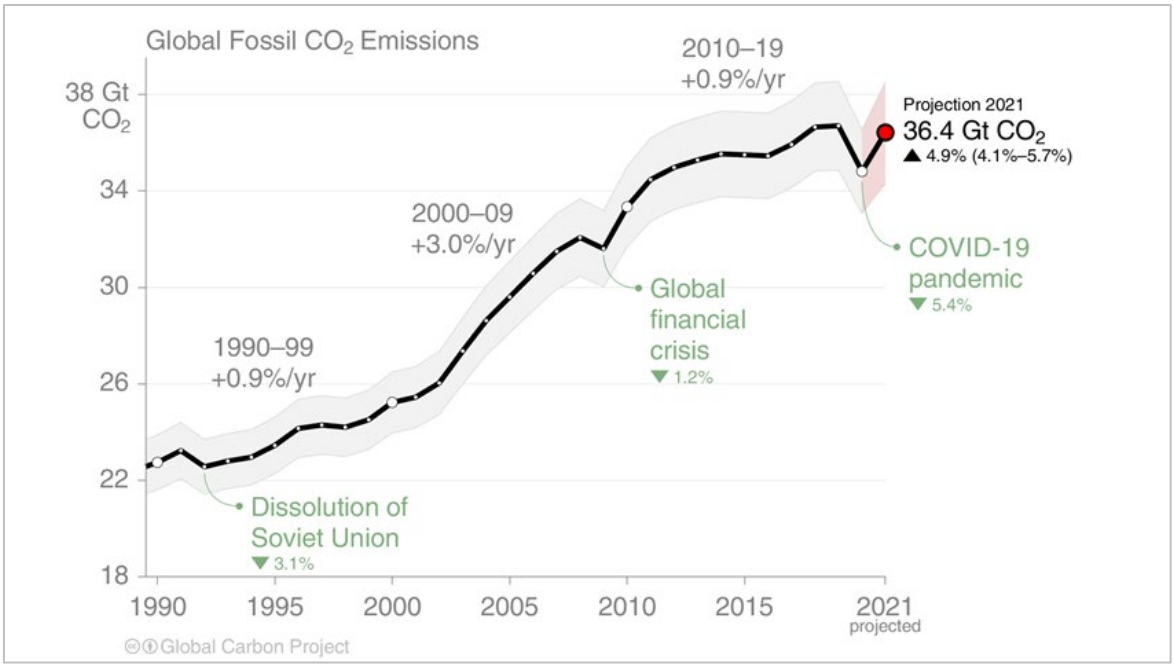


Fig. 1. Global Fossil CO_2 Emissions.
Citation: Global Carbon Project. (2021). Supplemental data of Global Carbon Budget 2021 (Version 1.0) [Data set]. Global Carbon Project. https://doi.org/10.18160/gcp-2021

Humanity has achieved economic development and a prosperous life through the use of fossil fuels, but the resulting global warming from fossil fuel combustion has emerged as a threatening issue for humanity. In 2021, the total global greenhouse gas emissions were reported to be approximately 36.4 $GtCO_2$ eq. This figure represents a 4.9% increase compared to 2020 and is attributed to the recovery from the impacts of COVID-19 and global economic slowdown.

When examining greenhouse gas emissions by sector, the energy sector accounts for the highest proportion, representing 73.2% of total emissions. Within this sector, energy use in industry contributes 24.2%, energy use in transportation contributes 16.2%, energy use in buildings contributes 17.5%, energy use in agriculture and fisheries machinery, such as agricultural machinery and fuel for fishing vessels, contributes 1.7%, and energy use in other sectors contributes 13.6%.

Of the greenhouse gas emissions (24.2%) resulting from energy use in transportation, 11.9% corresponds to emissions from the combustion of gasoline and diesel fuels in all forms of road transport, including cars, trucks, motorcycles, and buses. Within the road transport sector, 60% of the greenhouse gas emissions come from passenger transport, while the remaining 40% are generated by freight transport, according to surveys.

1. Summary

Market Status

Issues for achieving carbon neutrality

To achieve government carbon neutrality, an estimated investment of 1,800 trillion won is needed, which could lead to a multiple-fold increase in electricity prices.

정부 탄소중립案 하려면 약 1800조원 필요… 전기요금 수 배 오를듯

HOME > Global > 중국

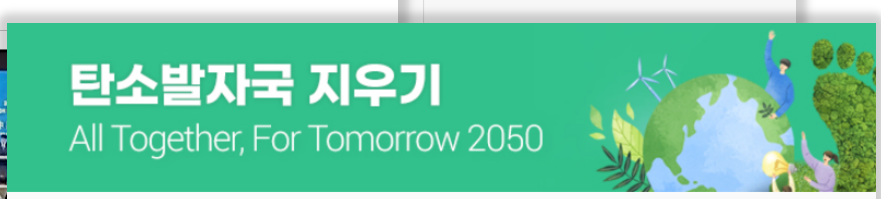
"중국, 2060년 탄소중립 달성에 2경4천조원 투자 필요"

China requires an investment of 22 trillion yuan to achieve carbon neutrality by 2060.

장사오강(張少剛) 중국국제무역촉진위원회

의 '탄소중립 경제발전 포럼'에서 "탄소중

=CCTV



[CESS 기획] 글로벌 시장 4000조… 韓國도 내년부터 돈 내고 탄소배출

The global market is valued at 4,000 trillion, and starting from next year, South Korea will also pay for carbon emissions.

UN, 블록체인 기술로 기후협약 이행 감시

UN is utilizing blockchain technology to monitor the implementation of climate agreements.

유엔기후변화사무국 CCC 창설

"거래투명성 높이고 비용절감 할 것"

유엔 기후 변화 사무국이 지난해 8월 독일 본에 모여

변화 사무국 공

유엔이 블록체인 기술을 기후협약에 적용하기 위해 기후체인연합(CCC·Climate Chain Coalition)를 결성한다.

UPDATED. 2022-04-17 10:53 (일)

HOME > 뉴스

테슬라, 올해 중국서 탄소배출권 팔아 4,600억 수익 전망. 폭스바겐은 730억 벌금

이상원 기

Tesla is expected to generate revenue of 460 billion won by selling carbon credits in China this year, while Volkswagen faces a fine of 73 billion won.

테슬라가 올해 중국에서만 4,600억 원 가량의 탄소배출권 수익을 올릴 것으로 예상됐다.

1. Summary

Market Status

Global climate action policies

United Nations Climate Change

UNFCCC

The United Nations Framework Convention on Climate Change (UNFCCC) is an international agreement in which countries worldwide have agreed to limit the emission of greenhouse gases, including carbon dioxide, in order to prevent global warming.

"A New Era of International Climate Action in the Global Carbon Market"

"Kyoto Protocol"

CDM

Clean Development Mechanism
(청정개발체계)

"New Climate Regime"

SDM

Sustainable Development Mechanism
(지속가능한 개발 체계)

- ✓ SDM (Sustainable Development Mechanism) is designed as a tool of results-based climate finance, with the aim of limiting global warming to 1.5°C and contributing to the achievement of the United Nations Sustainable Development Goals (SDGs) by reducing greenhouse gas emissions overall by 2030.
- ✓ SDM should be based on practical and measurable monitoring, reporting, and verification, and it should contribute to innovative changes.

1. Summary

Market Status

Limitations of Nationally Determined Contributions (NDC) policies

Based on government or corporate policies, there has been a plateau in the reduction rate of carbon emissions after a certain period of time in relation to climate actions through CDM (Clean Development Mechanism) activities. This limitation arises due to ongoing financial support and other policy costs associated with carbon reduction, leading to practical constraints in achieving substantial reductions in carbon emissions.

"Convergence of Nation-led Climate Action and People-centered Climate Action"

"Leaving No One Behind: 193 Countries, 2015-2030"

To overcome the limitations of policy-centric approaches, enhancing the competitiveness of climate action at the local and national levels through people-centered carbon reduction policies.

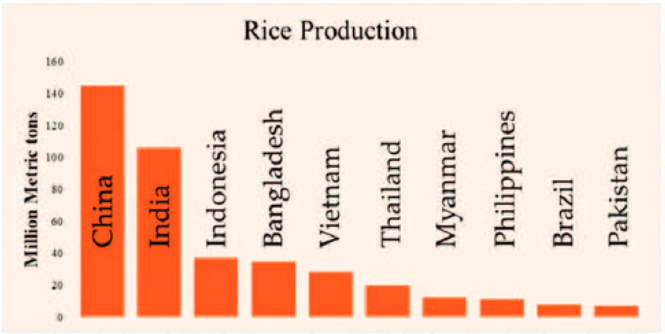
※ NDC: 국가탄소감축목표, Nationally Determined Contributions

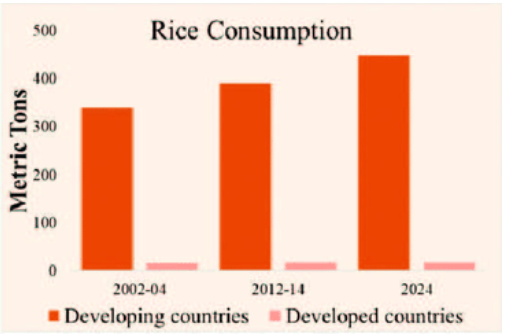
1. Summary

Market Status

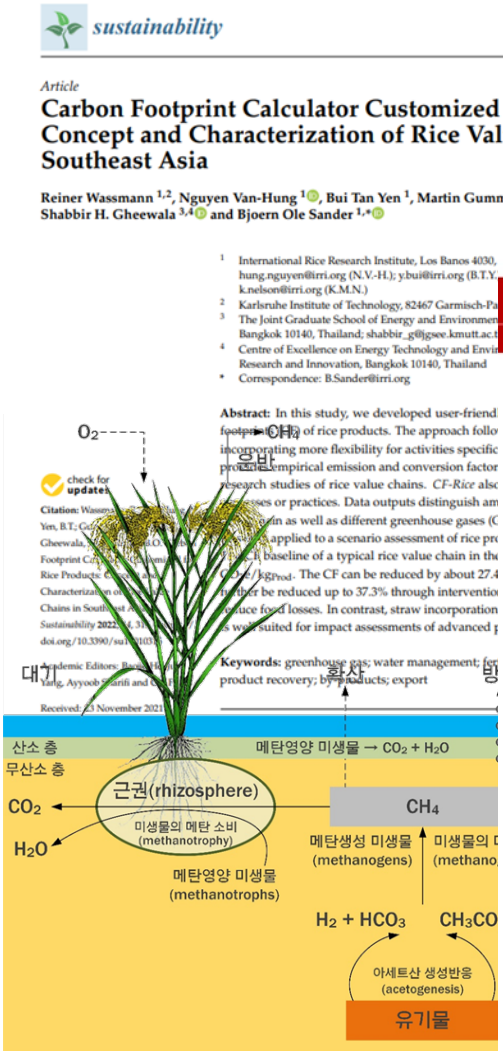
Continuous expansion of carbon emission reduction policies

The rise of low-carbon, eco-friendly farming methods such as smart farming and alternative approaches.





※ Source : https://publikationen.bibliothek.kit.edu/1000142400/142938749



sustainability MDPI

Article

Carbon Footprint Calculator Customized for Rice Products: Concept and Characterization of Rice Value Chains in Southeast Asia

Reiner Wassmann [1,2], Nguyen Van-Hung [1], Bui Tan Yen [1], Martin Gummert [1], Katherine M. Nelson [1], Shabbir H. Gheewala [3,4] and Bjoern Ole Sander [1,*]

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* Correspondence: B.Sander@irri.org

Abstract: In this study, we developed user-friend footprint calculator of rice products. The approach follo incorporating more flexibility for activities specific pro empirical emission and conversion factor research studies of rice value chains. *CF-Rice* also sses or practices. Data outputs distinguish am in as well as different greenhouse gases (G applied to a scenario assessment of rice pr baseline of a typical rice value chain in the CO2/kgProd. The CF can be reduced by about 27.4 further be reduced up to 37.3% through interventio reduce food losses. In contrast, straw incorporation is well suited for impact assessments of advanced p

Keywords: greenhouse gas; water management; for product recovery; by-products; export

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NEWS

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Business | Market Data | New Economy | New Tech Economy | Companies | Technology of Business | Economy |

Climate change: New Zealand's plan to tax cow and sheep burps

9 June 2022

Climate change

By Peter Hoskins
BBC News

New Zealand has unveiled a plan to tax sheep and cattle burps in a bid to tackle one of the country's biggest sources of greenhouse gases.

It would make it the first nation to charge farmers for the methane emissions from the animals they keep.

※ Source : https://www.bbc.com/news/business-61741352

1. Summary

Market Status

Current status of the carbon emissions trading market.

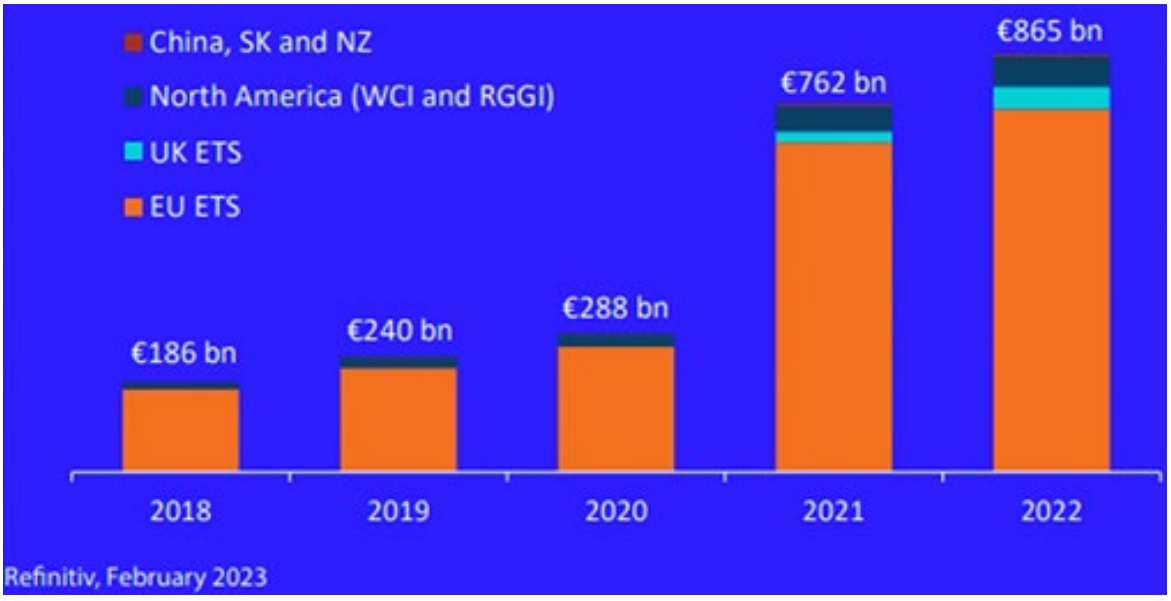
Voluntary Carbon Market

$2 billion USD/year

About 400% increase compared to 2020

Compliance Carbon Market

86.5 billion EURO/year



1. Summary

Market Status

Types of carbon emission trading markets

	Compliance Carbon Markets	Voluntary Carbon Markets
Market functions	• To comply with the limits on greenhouse gas emissions that apply to regulated entities, they are permitted to buy and sell carbon allowances. This allows them to manage their emissions and ensure compliance with the prescribed limits. • As the available carbon credits decrease over time, it ensures a guarantee for decarbonization.	• **Participants can purchase carbon offsets to reduce their greenhouse gas emissions from manufacturing processes, electricity usage, and transportation.** • **There is no limit to the number of available offsets, and it continues to increase.**
Market participants	• Institutions such as emission trading systems, banks, energy trading companies, institutional investors, and hedge funds are required to comply with regulations regarding carbon credit trading.	• **Businesses, investors, governments, non-governmental organizations (NGOs), non-profit organizations, universities, local authorities, and individuals.**
Market regulation	• The creation and regulation of carbon reduction plans (NDCs) are carried out by countries, regions, or international bodies.	• **The functions outside the compliance carbon market** • **The voluntary carbon market is generally unregulated.**
Types of credit	• Permission for environmental pollution and project-based emission reduction credits.	• **Project-based emission reduction credits.**
Credit issuer	• Certification bodies recognized by government and institutions for compliance with regulations.	• **Independent Certification Authority.**

1. Summary

Market Status

Key national electric vehicle policies

division	status
 **VIETNAM**	• As of 2020, Vietnam had over 65 million registered motorcycles (with annual sales of over 3 million). • **Vehicles, including motorcycles, account for about 70% of major urban air pollution.** • Five major cities are planning to prohibit or control the operation of internal combustion engine vehicles in specific areas after 2030. • Honda (with over 75% market share) and Yamaha (with over 20% market share) dominate the Vietnamese motorcycle market, occupying over 90% of the market.
 **INDONESIA**	• Around 110 million motorcycles are registered in Vietnam. • The local content requirement for electric motorcycles has been legislated, aiming for 40% domestic parts usage by 2023 and 80% by 2030. • Approximately 30 million or more motorcycles with outdated internal combustion engines, such as Honda and Yamaha, are targeted for retrofitting or replacement.
 **PHILIPPINES**	• As of 2021, there are approximately 80 million motorcycles in operation, which are the main mode of transportation. • Due to the concerns over costs and insufficient charging infrastructure, there have been challenges in implementing the electric vehicle transition plan. • It is estimated that there are currently more than 80 million outdated internal combustion engine motorcycles and tricycles that are subject to retrofitting or remanufacture.
 **INDIA**	• They are ranked as the third-largest emitter of carbon dioxide in the world. Their goal is to reduce emissions by 45% by 2030 compared to the levels in 2005. • The annual sales of motorcycles reach approximately 20 million units, accounting for about 27% of the global market. • With the increasing demand for high-performance powertrains and high-capacity batteries in electric motorcycles, it is expected that the sales prices will rise, exceeding 600,000 units annually.

1. Summary

Market Status

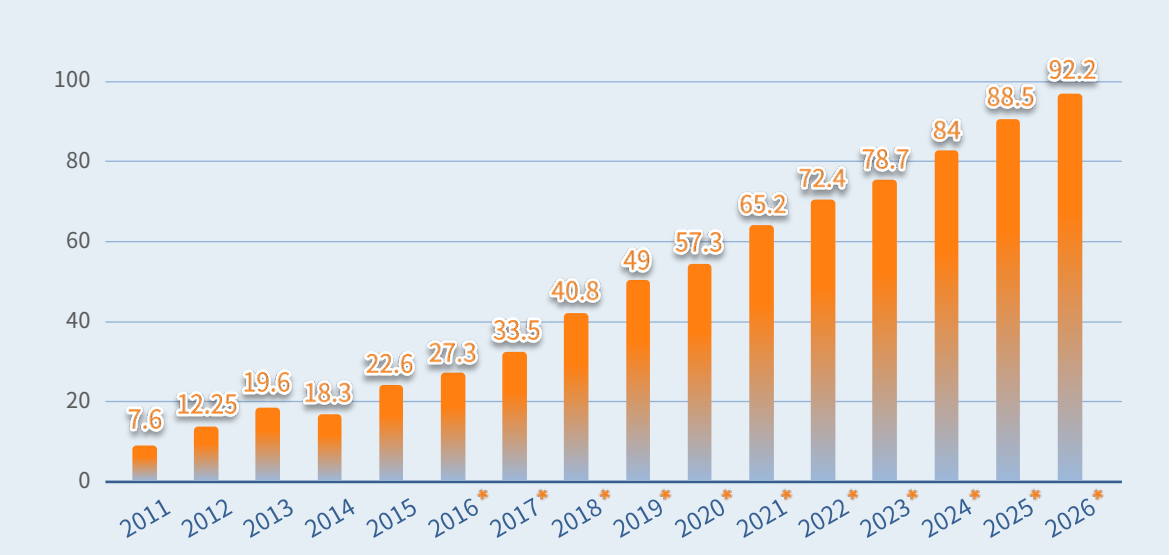
Data Market Size Forecast

- Global] (in 2017) $ 150.8 bn → (in 2020) $ 210 bn (Annual average growth of 11.9%)
  - → Market Size by Region in ’17 :
    US ($ 78.8 bn), Western Europe ($ 34.1 bn), Asia-Pacific (excluding Japan) ($ 13.6 bn)
  - → Market size by Industry in ’17 :
    Banking, assembly manufacturing, process manufacturing, federal / central government, and professional services ($ 72.4 bn in five areas)
- [Korea] (in 2017) 6297.3 bn KRW → (in 2020) 7845 bn KRW (Annual average growth of 7.6%)
  - → Market size by Sector in '17
    Data construction / consulting (3 tn KRW), Data service(1.7 tn KRW)
    Data solution (1.6 tn KRW)

※ [Source] Worldwide Semiannual Big Data and Analytics Spending Guide, IDC 2017. 4 / Data Industry Survey Report, Korea Data Agency 2017. 3

BigData Global Market Size Forecast: 2011-2026

Unit: 1 billion USD



※ Note *is a Forecast, Source: Statista

※ Source : Wikibon Big Data in the Public Cloud Forecast, 2016-2026(Wikibon)

- According to market researcher Wikibon, the world's BigData market, including software, hardware and services, will grow to a total of $ 92.2 billion in 2026, the next decade.
- An increase of about 404% from $ 18.3 billion recorded in 2014, and an average annual growth rate of 14.4% from 2014 to 2026

2. Why PCRM?

Climate action and PCRM

Climate action?! So, what about you?

Is there a reward for climate action?

01

Does using public transportation count as climate action?

Well, I have a private vehicle, but I often use public transportation. I'm not sure if this counts as climate action. Can I also receive rewards for climate action?

02

I am interested in environmentally friendly and recyclable products such as eco-friendly or reusable bags for nature conservation.

I try to avoid single-use items as much as possible and make an effort to use eco-friendly and low-carbon products. I have a lot of concerns about using recyclable products like eco-friendly bags. Additionally, I am generally interested in recycling and practice proper waste separation as well.

REWARD

03

I do make some efforts to take climate action, but...

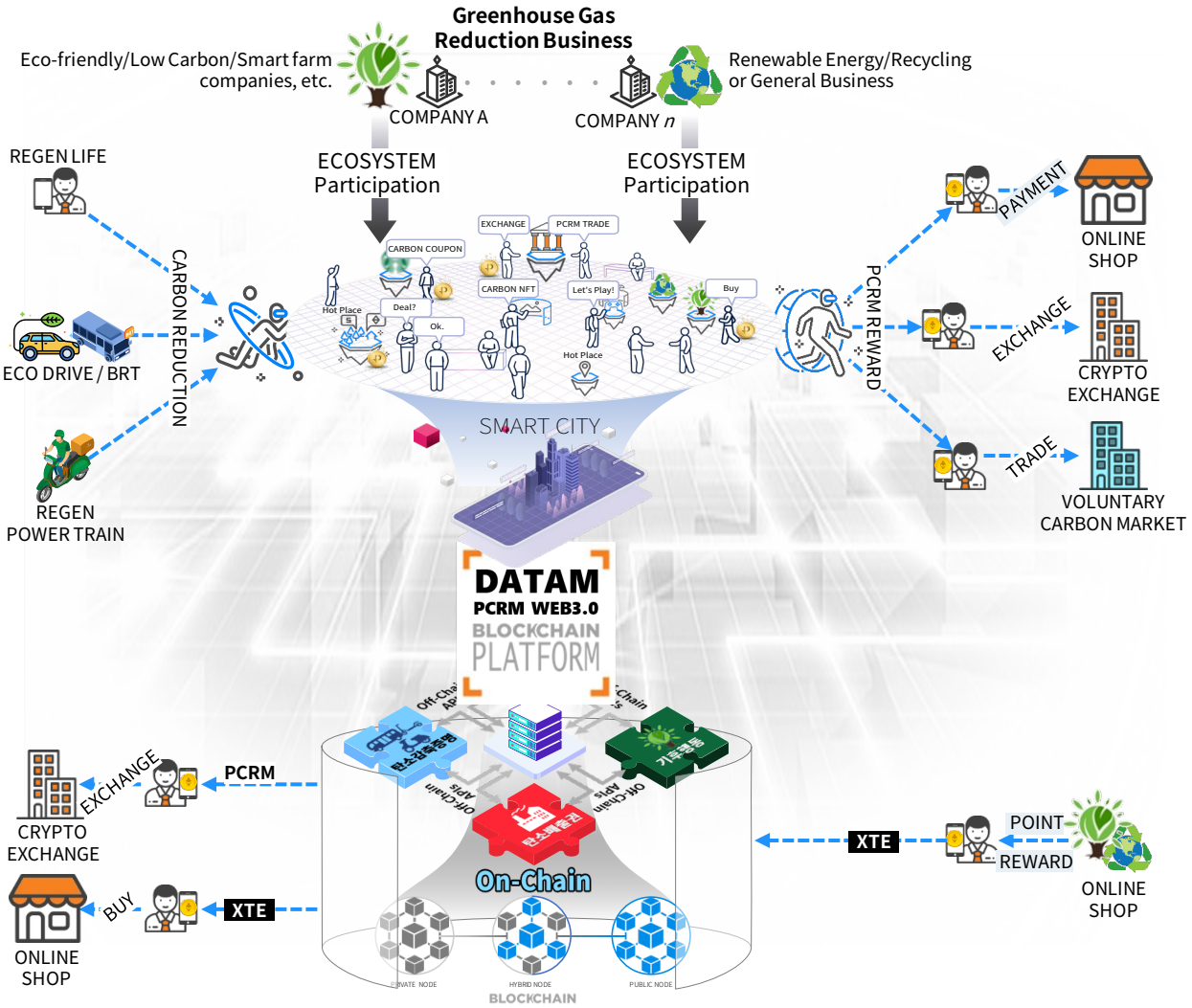
Although nobody may recognize it, I do take some climate action and find personal satisfaction in it... But I feel like it would be great to have a stronger momentum or motivation.

PCRM ECOSYSTEM

PCRM XTE WEB 3.0 BLOCKCHAIN PLATFORM

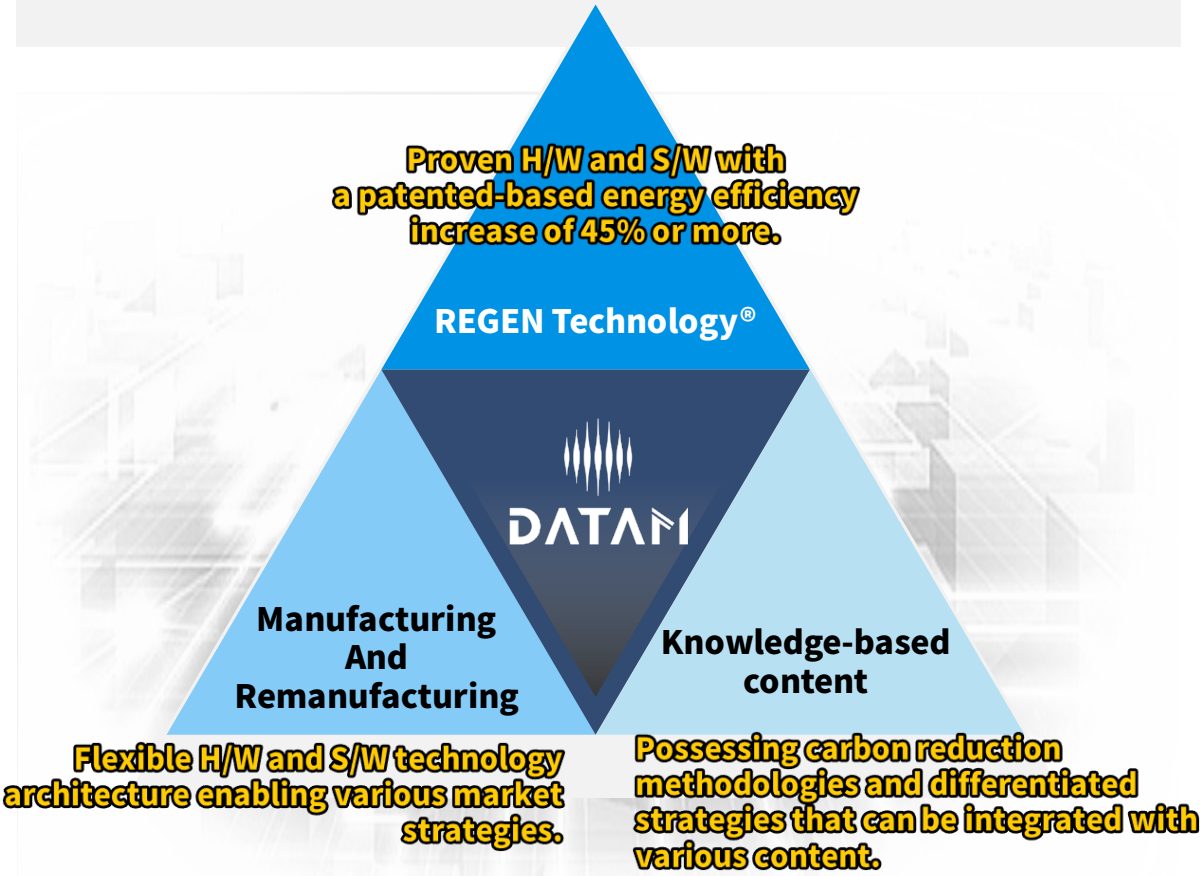
The PCRM ecosystem offers a reward system based on patent-based carbon reduction certification, as well as a blockchain-based XTE (Many X To Earn) WEB 3.0 service environment, which allows various users and companies to participate. Through the PCRM platform's new XTE service, participating users and associated companies can not only receive carbon reduction certification but also have access to various points and rewards that can be shared and used in a circular manner on the blockchain. The platform provides various interfaces and services through API, enabling users to experience the value of PCRM platform's WEB 3.0 circular sharing in an integrated environment.

The PCRM XTE WEB 3.0 BLOCKCHAIN PLATFORM provides a measurable and verifiable streamlined ecosystem for activities occurring in the lifecycle by leveraging blockchain technology to bring off-chain activities on-chain. It aims to achieve self-sufficiency and sustainable development goals (SDGs) such as smart cities by enabling measurement, reporting, and verification of these activities.



2. Why PCRM?

PCRM differentiation strategy



1 Software and hardware that maximize energy efficiency based on patents

- A patent-based blockchain reward system for carbon emission reduction proof for user or company's climate actions, applicable in various fields.
- Commercialization of "Cognitive Responsive Technology® (REGEN Technology®)" with proven increase in energy recovery efficiency of 45% or more, based on patented technology.

2 New vehicle production and internal combustion engine electrification remanufacturing

- Manufacturing and distribution of electric motorcycles, complete new vehicles, utilizing patent-based technology, both domestically and internationally.
- The "REGEN Powertrain" can be easily applied to existing internal combustion engine motorcycles, either as component units or through technological partnerships, enabling policy access to potential retrofitting market.

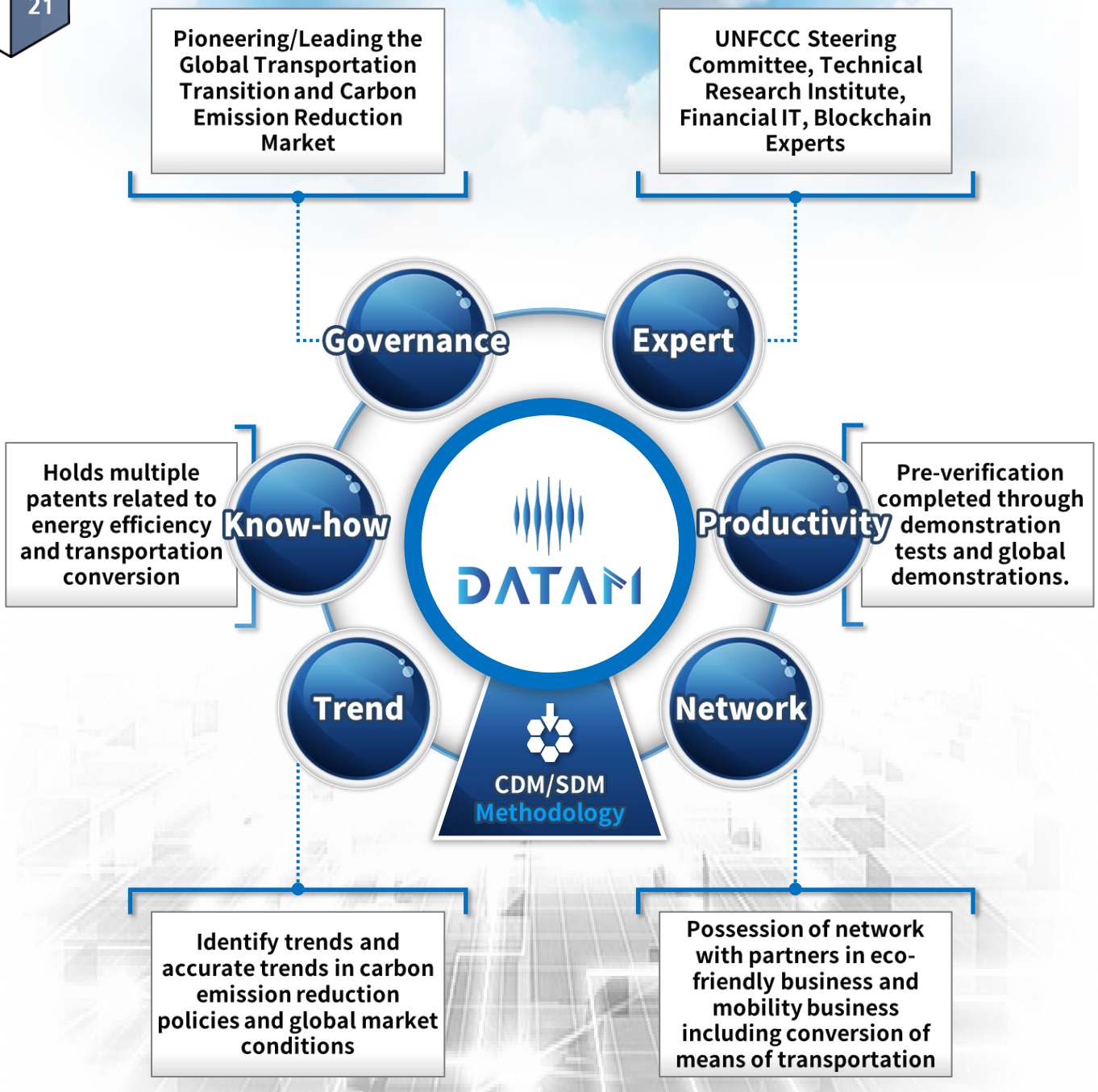
3 Consulting on carbon reduction methodology and related policies

- The increasing participation of carbon-neutral countries driven by policies from organizations such as the UN and EU has led to a rapid and progressive adoption of electrification in internal combustion engine vehicles and transportation modes.
- With expertise in developing carbon measurement methodologies and consulting capabilities aligned with UN standards, both domestically and internationally, the platform possesses a solid foundation to apply "Cognitive Responsive REGEN Technology®" to various business models and carbon reduction policies.

2. Why PCRM?

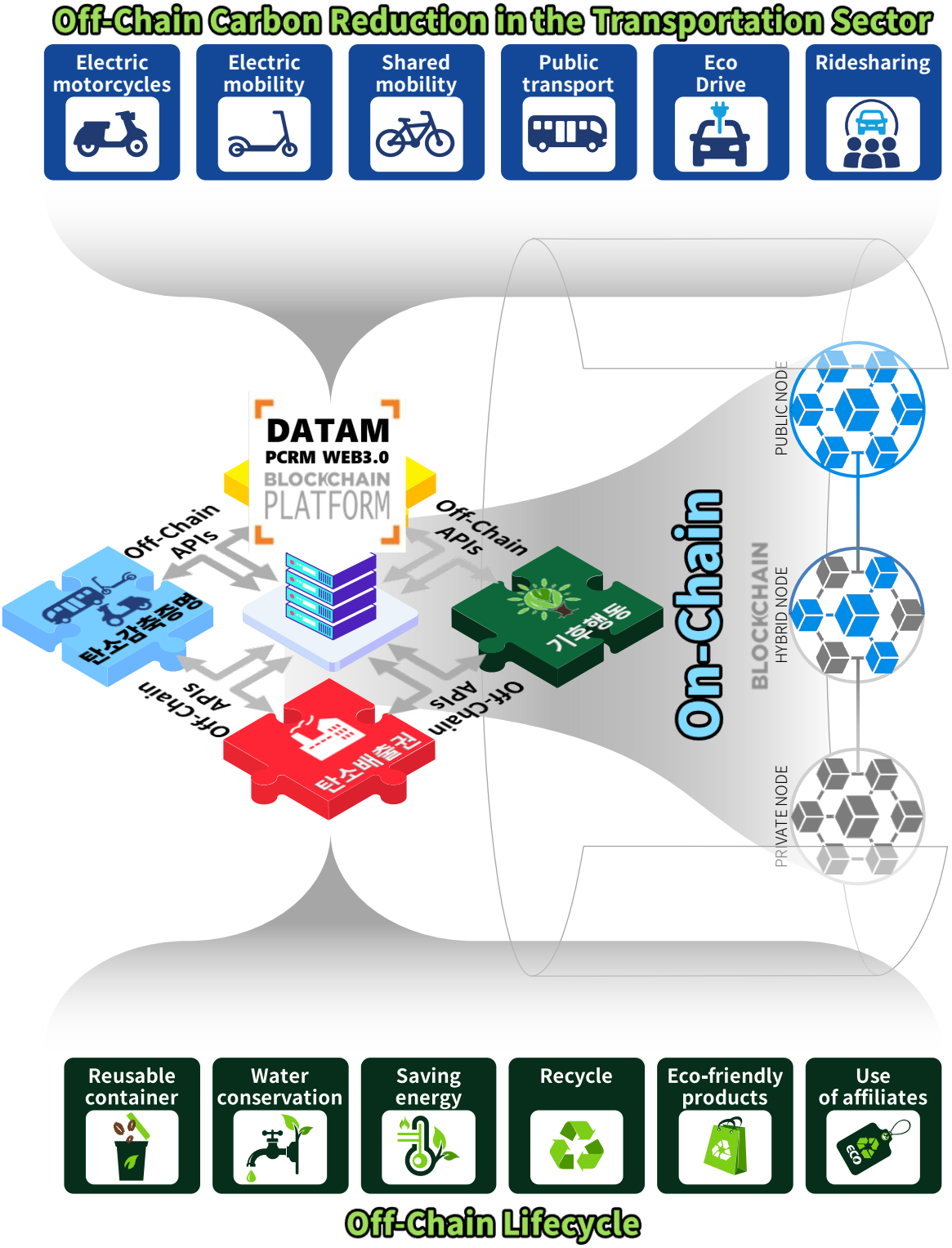
PCRM competitiveness

The platform possesses a solid foundation with a team of experts who have conducted extensive research and development in carbon reduction technologies over the years. This team includes specialists in mobility development, financial IT, and blockchain development, enabling the platform to have a stable revenue base through business models that align with market value and future trends.



On-Chain integration of Off-Chain lifecycle

Rewarding Carbon Emission Reduction through On-Chain Transformation of Off-Chain Lifecycle

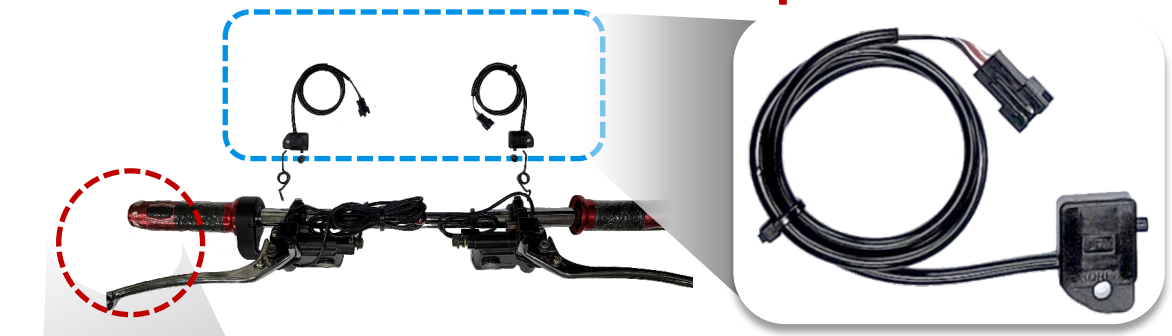


2. Why PCRM?

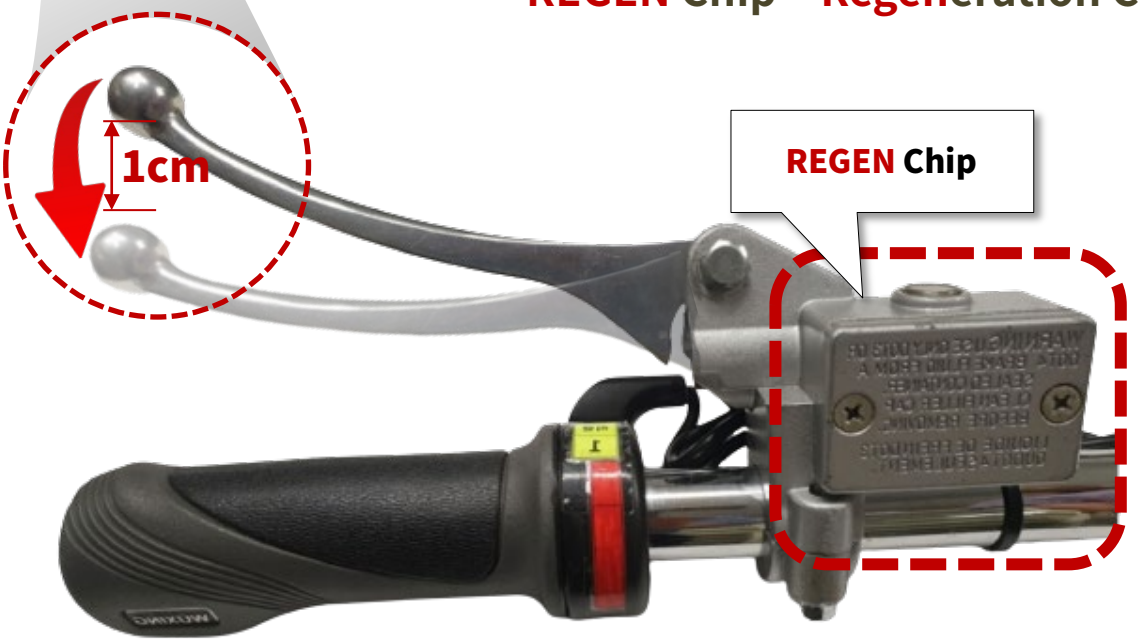
Off-Chain carbon reduction patented technology

1cm Innovation" Cognitive Responsive REGEN TECHNOLOGY®

Miracle of a 1cm Grip Brake



REGEN Chip = Regeneration Chip



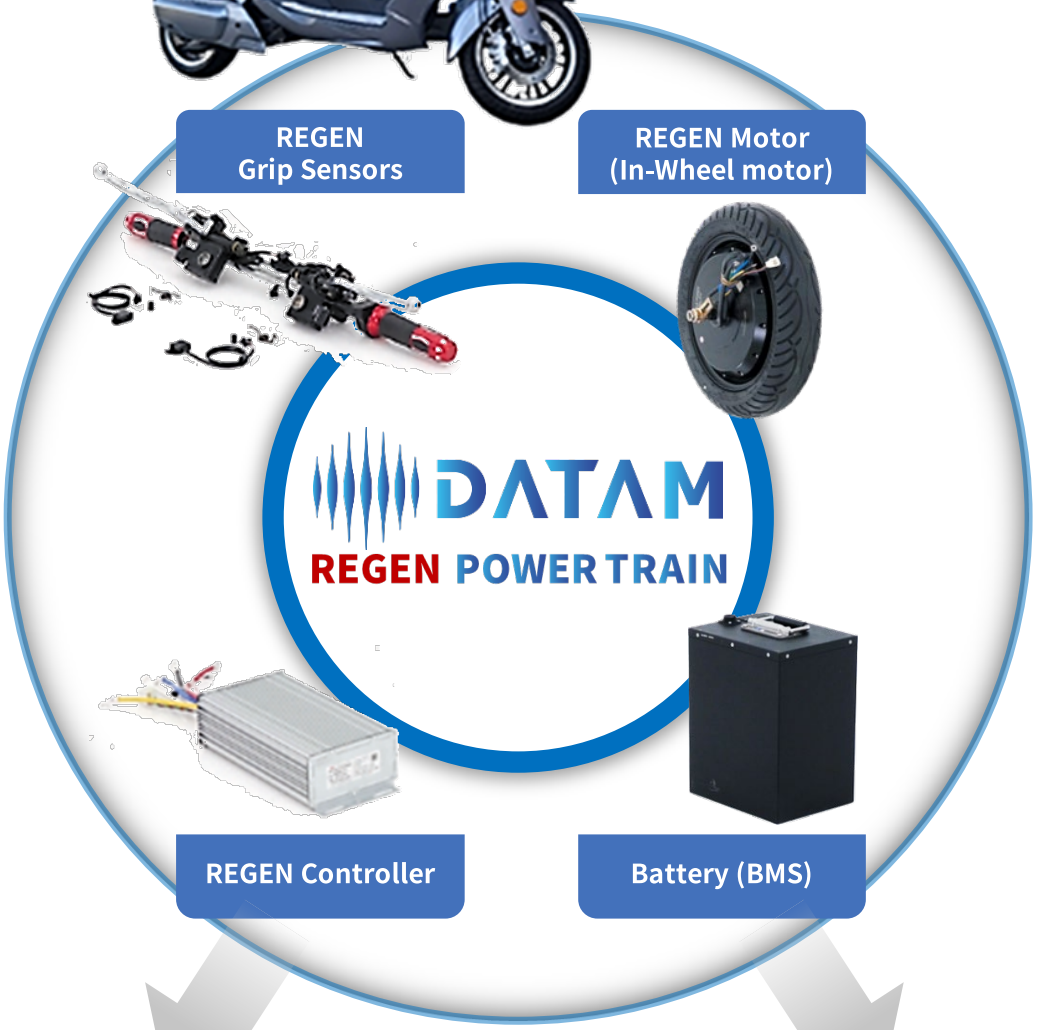
“This is **Magic Chip**”

1. Innovative technology that dramatically recovers discharged energy from batteries
2. **25-50% Increase** mileage per charge
3. Recovering discharged batteries by gripping the brake to restore them to **78%** or higher
4. Up to **50%** energy saving during battery charging

Cognitive response technology : REGEN POWERTRAIN

"REGEN POWERTRAIN" = Carbon Emission Reduction Certification

DATAM EV MOTORCYCLE
Driving more then 300 km
on a single charge



APPLY GLOBAL BRAND TECHNOLOGY

GASOLINE MOTORCYCLE
REMANUFACTURING to EV

2. Why PCRM?

PCRM-related patents (PCT)

Patent number	Title of Invention	Status	Products
No. 2301741	A Controller System of Brake for Electric Vehicle)	H/W, S/W (Commercialization completed)	REGEN Grip/Sensor, REGEN Motor
No. 2227541	An Electric Vehicle with Simply Operated Brake	H/W, S/W (Commercialization completed)	REGEN Grip/Sensor
No. 2227542	A Sound Controllable Electric Vehicle	H/W, S/W (Commercialization completed)	REGEN Controller
No. 1763915	System For Collecting And Analyzing Big Data By Monitoring Car's And Road's Conditions	H/W, S/W (Commercialization completed)	REGEN Controller KES-EM-22K0240 (Completed KC and TUV certification)
No. 1885674	Real Time Measurement Device For Providing Data Of Carbon Dioxide Output In Cryptocurrency Rewarding System For Compensating For Carbon Emission Reduction With Cryptocurrency	H/W, S/W (Commercialization completed)	REGEN Controller KES-EM-22K0240 (Completed KC and TUV certification)
No. 1925988 PCT/KR2018/006373	Method For Calculating Energy Consumption Of Car By Utilizing Deep Learning For Implementing The Reduction Of Carbon Discharge	S/W (development completed)	PCRM WEB3.0 BLOCKCHAIN PLATFORM
No. 1703115	Cruise Control System Implementing Eco-Drive Function Realizing Fuel Efficiency Enhancement In Downhill Section	H/W, S/W (Commercialization completed)	KES-EM-22K0240 (Completed KC and TUV certification)
No. 1914576 PCT/KR2018/003556	Rewarding System For Carbon Emission Reduction Using Cryptocurrency	S/W (development completed)	PCRM WEB3.0 BLOCKCHAIN PLATFORM
No. 2001068	System For Issuing And Giving Cryptocurrency For Individual Voluntary Greenhouse Gas Reduction Act	S/W (development completed)	PCRM WEB3.0 BLOCKCHAIN PLATFORM
No. 1914575 PCT/KR2018/003554	Cryptocurrency Payment System For Providing Discount As A Reward For Carbon Emission Reduction	S/W (development completed)	PCRM WEB3.0 BLOCKCHAIN PLATFORM
No. 1538354	Eco-Drive Inducement Device Realizing Fuel Efficiency Enhancement In Downhill Section	H/W, S/W (Commercialization completed)	KES-EM-22K0240 (KC인증 및 EU인증 완료)
No. 2472552	Method For Calculating Energy Consumption And Carbon Discharge Of Car By Utilizing Deep Learning	S/W (development completed)	PCRM WEB3.0 BLOCKCHAIN PLATFORM

2. Why PCRM?

Global REGEN project goals

"Markets such as China, India, Vietnam, Indonesia, Philippines, and others"
Approximately 1 billion internal combustion engine motorcycles

Regarding approximately 15% of 150 million units

The goal is to apply and distribute the "REGEN Powertrain"

As a result, there will be an annual reduction of 150 million tons of carbon dioxide.

When converted based on carbon reduction, it will generate a value of approximately 31 billion dollars.

3. Off-Chain carbon reduction technology

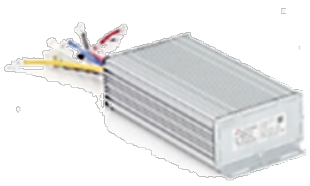
3. Off-Chain carbon reduction technology

Overview of Cognitive Response REGEN Technology®

New braking H/W and S/W technology that enables automatic regenerative charging during braking without the need for separate regenerative braking activation.

- The compact design of the all-in-one grip allows for excellent performance while having minimal impact on manufacturing costs, thereby enhancing price competitiveness.
- When applying the REGEN powertrain to electric motorcycles that are predominantly used for urban road driving, it enables a significant improvement in energy efficiency.

REGEN Grip Sensors	REGEN Motor (In-Wheel motor)	REGEN Controller



DATAM Development of the world's first cognitive response technology OBS press video release

https://www.youtube.com/watch?v=EhW-Iq2h5qI

YouTube

Key technologies of Cognitive Response REGEN Technology®

Key components	Technological distinctiveness	Notes
REGEN In-wheel Motor 	● **The use of a high-output BLDC motor with strong torque.** ➡ It has low noise and heat generation, long lifespan, and high energy efficiency. ➡ Easy variable speed and precise control from low to high speeds. ➡ Improved performance for climbing slopes and other challenging terrains. ➡ Possible miniaturization and lightweight design (allowing for integrated tire systems).	Patented Technology
REGEN grip sensor 	● **Through Grip Sensing Control, two-stage braking is possible** ➡ 1st Stage: Regenerative braking mode, where braking is achieved through motor reverse rotation. ➡ 2nd Stage: Brake disc operation for conventional braking. ➡ Extended lifespan of brake discs. ➡ Battery charging during the ride (extending the driving range).	Patented Technology
REGEN Controller 	● **Precise electronic control of all major components, including the motor and regenerative braking.** ➡ Prevention of sudden acceleration through precise control of motor rotation speed and output. ➡ Optimization of motor and battery control for improved energy efficiency. ➡ Integration of regenerative braking system control for extended driving range. ➡ Incorporation of electronic control and software for ensuring safety and other security measures.	Patented Technology

3. Off-Chain carbon reduction technology

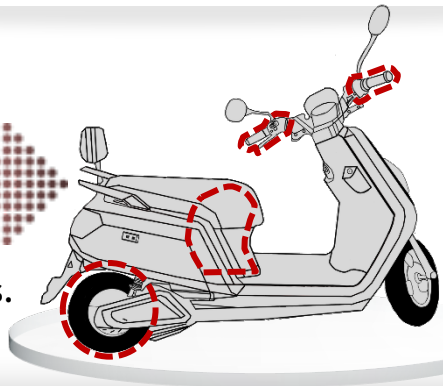
Cognitive response technology-based REGEN Powertrain

"Existing internal combustion engine motorcycles and electric motorcycles can be recycled and their resources can be reused."

Optimization model of UNFCCC SDM carbon reduction methodology

REGEN Technology®

Applying the REGEN Powertrain to existing electric motorcycles.



- ✓ Replacing the in-wheel motor with the REGEN Powertrain.
- ✓ Installing the REGEN grip sensor.
- ✓ Installing the REGEN Controller.
- ✓ Using the existing battery.

1 Regenerative braking/recharging during inertial driving.

Fully automated regenerative braking and recharging during inertial driving.

+

2 Mechanical braking compatible regenerative braking and recharging.

Fully automatic regenerative braking and recharging that works in conjunction with mechanical braking force.

+

3 Regenerative braking and recharging through cognitive response.

Automatic regenerative braking and recharging triggered by cognitive response to brake pedal input.

More than 45% energy savings achieved.
More than 30% carbon reduction effect.

3. Off-Chain carbon reduction technology

Global pilot testing and energy efficiency validation

"Successful demonstration tests of the REGEN powertrain at the G20 Indonesia Bali event."

G20 INDONESIA 2022 RECOVER TOGETHER RECOVER STRONGER

Test Conditions

· Test Motorcycle : Honda Benly 110 Pro 2015 remanufactured as an electric motorcycle
· Battery : 72V/42Ah
· Motor : DATAM in wheel type / 3kW

Test Results

Energy economy improvement 56.71%

Item			1st Test		2nd Test		3rd Test		4th Test		Average
			Non-ReGen	ReGen	Non-ReGen	ReGen	Non-ReGen	ReGen	Non-ReGen	ReGen	
Driving distance(km)			5.320		9.233		7.138		8.031		
Max. speed(km/h)			28.8		33.8		35.1		33.1		
Ave. speed(km/h)			10.30		23.08		14.77		13.77		
Battery	Departure	Voltage(V)	79.0	79.0	77.4	77.9	73.9	75.4	72.0	74.0	72.2
		Power(Wh)	3,318.0	3,318.0	3,250.8	3,271.8	3,103.8	3,166.8	3,024.0	3,108.0	3,032.4
	Arrival	Voltage(V)	76.9	77.6	74.1	75.5	71.2	73.8	69.1	72.3	70.9
		Power(Wh)	3,229.8	3,259.2	3,112.2	3,171.0	2,990.4	3,099.6	2,902.2	3,036.6	2,977.8
Power consumption(Wh)			88.2	58.8	138.6	100.8	113.4	67.2	121.8	71.4	54.6
Energy efficiency(km/kWh)			60.32	90.48	66.62	91.60	62.95	106.22	65.94	112.48	89.05
ReGen effects	Energy economy improvement(%)		50.00		37.50		68.75		70.59		56.71
	Energy recovery(Wh)		29.4		37.8		46.2		50.4		40.95
	Carbon reduction($gCO_2eq.$)		23.020		29.597		36.175		39.463		32.06

3. Off-Chain carbon reduction technology

Measured proof results of REGEN Powertrain

After applying the REGEN powertrain to the existing electric motorcycles and conducting road tests, the following improvements were observed:

- ✓ **Peak Torque improved by over 40%.**
- ✓ **Greenhouse gas emissions reduced by over 30%.**

Furthermore, the improved electric motorcycles demonstrated excellent uphill climbing capabilities. They were able to climb slopes with a gradient of up to 16.5° even with two passengers onboard (approximately 100kg of additional weight), and were able to start moving freely after stopping on an uphill slope.

Test vehicle		Motor	Battery	Real vehicle driving test result			
				Speed (km/h)	charging mileage (km)	Fuel efficiency(km/kW)	green gas(g CO_2/km)
P Brand	Manufacturer's existing model	G2000W -32pole	72V 42Ah 리튬	58.00	61.60	20.40	24.51
	DATAM REMANUFACTURE	**DATAM 3000W**	**72V 42Ah 리튬**	**81.50**	**101.70**	**33.44**	**14.95**
	Improvement effects			**23.50 (40.52%⬆)**	**40.10 (65.10%⬆)**	**13.04 (63.92%⬆)**	**-9.56 (39.00%⬇)**
I Brand	Manufacturer's existing model	QS72V 3000W	72V 42Ah 리튬	77.00	38.65	20.67	24.19
	DATAM REMANUFACTURE	**DATAM 3000W**	**72V 42Ah 리튬**	**82.00**	**91.75**	**30.38**	**16.46**
	Improvement effects			**5.00 (6.49%⬆)**	**53.10 (137.39%⬆)**	**9.71 (46.98%⬆)**	**-7.73 (31.96%⬇)**

ReGen Electric Motorcycle Demonstration Test Report Video
https://www.youtube.com/watch?v=qiNMgGLCZ60&t=5s

YouTube

DATAM

3. Off-Chain carbon reduction technology

Carbon reduction capacity of REGEN Powertrain

- ✓ 80% reduction in carbon emissions compared to the most popular internal combustion engine motorcycles in terms of market share.
- ✓ 33% reduction in carbon emissions compared to conventional electric motorcycles.

Carbon emission reduction compared to ICE motorcycles

Per day **6.22kg CO_2eq**

Based on 5,000,000 units 1year **11,350,000톤 CO_2eq**

Based on 5,000,000 units 10years **113,500,000톤 CO_2eq**

Carbon emission reduction compared to conventional electric motorcycles

Per day **0.77kg CO_2eq**

Based on 5,000,000 units 1year **1,405,000톤 CO_2eq**

Based on 5,000,000 units 10years **14,050,000톤 CO_2eq**

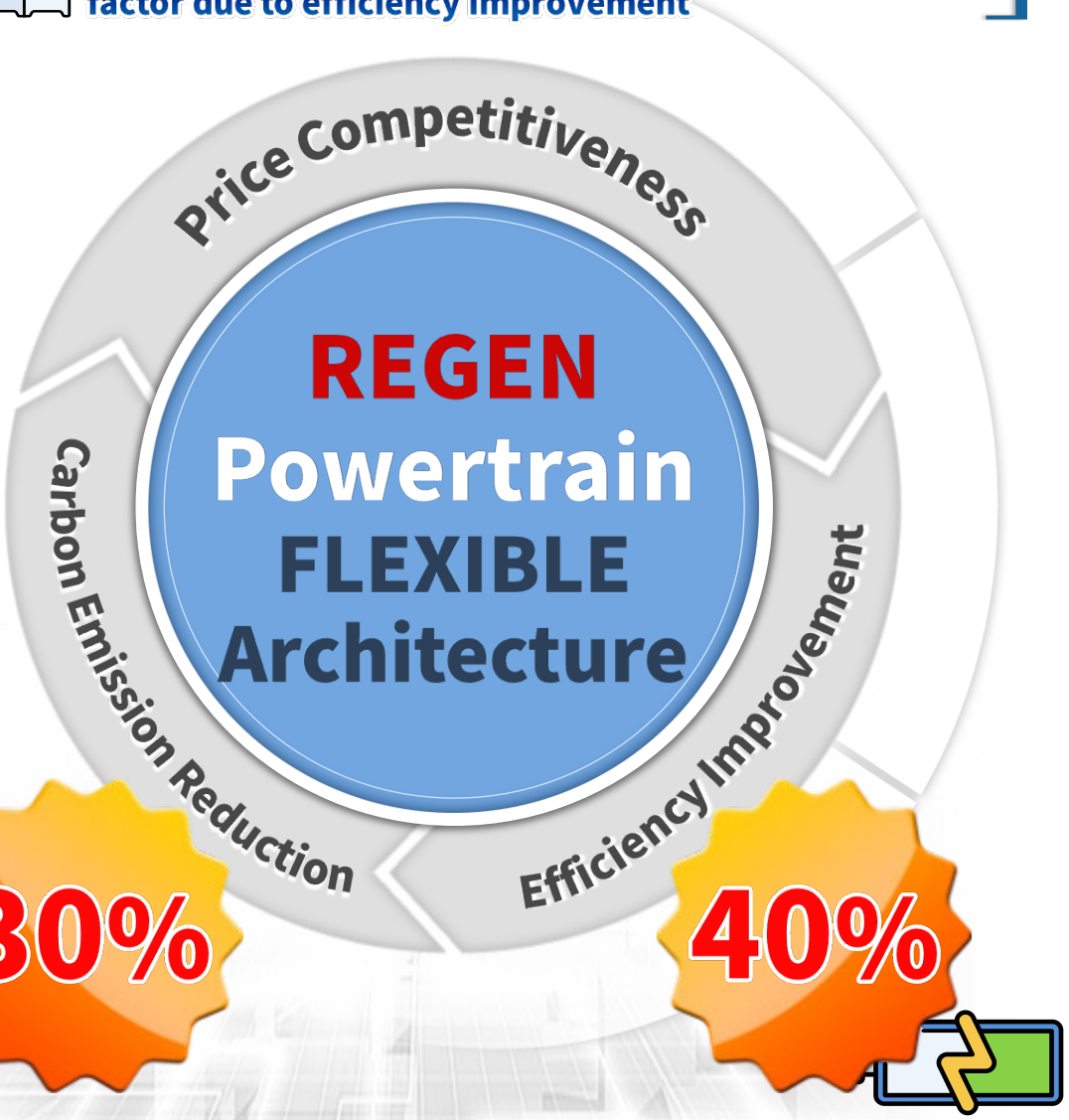
Div.	Transport vehicle	Fuel (energy) consumption Carbon generation
ICE	HONDA PCX 125cc	100km/day ÷ 30km/L = **3.34L/day**
		3.34L/day X 2.33kg CO_2eq/L = **7.78kg CO_2eq/day**
전기	Conventional electric motorcycle	100km/day ÷ 20km/kWh = **5.00kWh/day**
		5.00kWh/day X 0.466kg CO_2eq/kWh = **2.33kg CO_2eq/day**
	REGEN Powertrain electric motorcycle	100km/day ÷ 30km/kWh = **3.34kWh/day**
		3.34kWh/day X 0.466kg CO_2eq/kWh = **1.56kg CO_2eq/day**

* ICE : Internal Combustion Engine
* Assuming an average city fuel economy of 30km/L and a daily driving distance of about 100km

3. Off-Chain carbon reduction technology

Key features of REGEN Powertrain

Rethinking price competitiveness due to reduction in battery purchase cost, which is a major price increase factor due to efficiency improvement



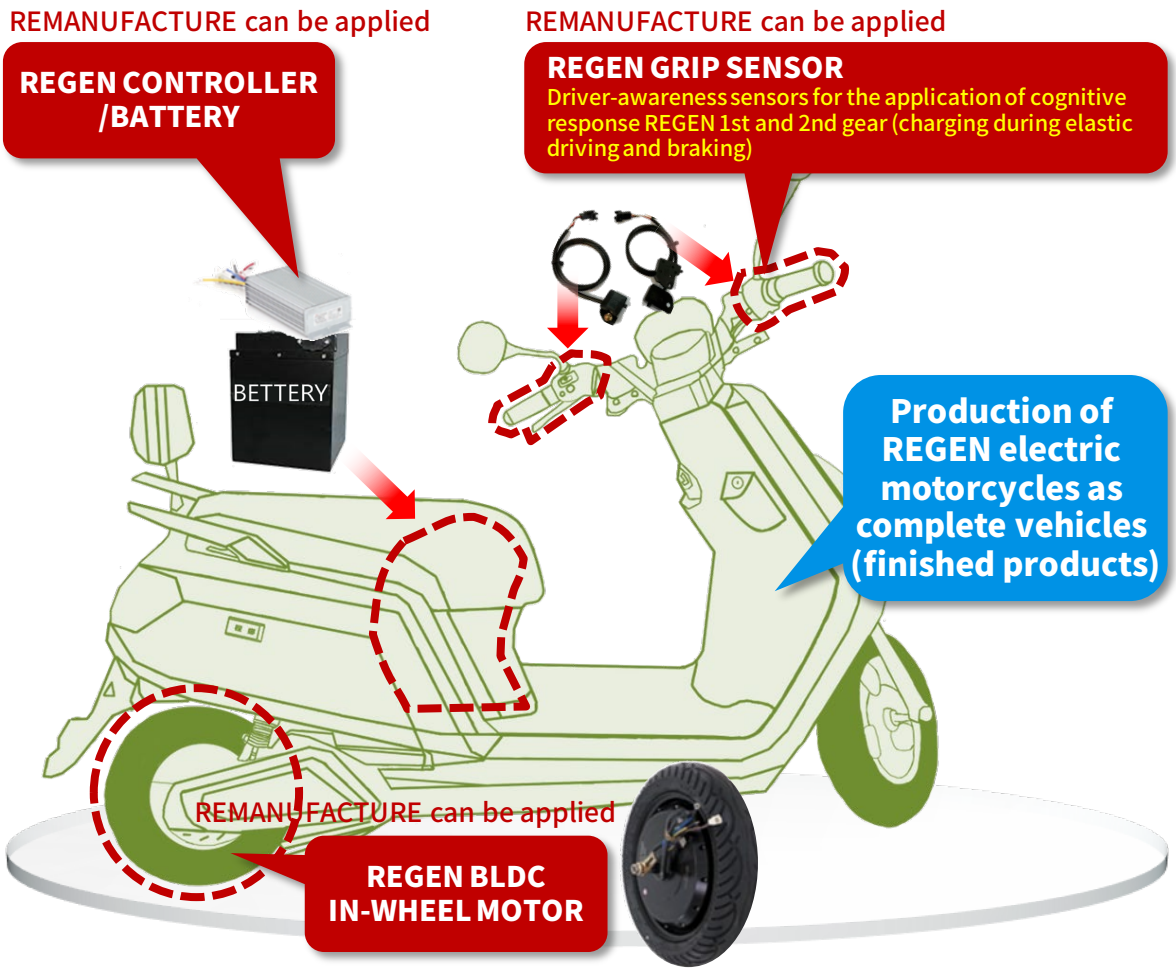
Energy efficiency improvement reduces battery charging power by about **30%**

More than **40%** increase in driving distance per charge with the same battery capacity

3. Off-Chain carbon reduction technology

Architecture of REGEN Powertrain

The REGEN Powertrain is a flexible architecture that enables entry into various business sectors, including the production of complete vehicles, as well as collaboration with existing manufacturers in the production of conventional two-wheeled transportation. Through reengineering existing motorcycles, it allows for the production of new complete vehicles, the sale of parts, remanufacturing, carbon reduction certification, and other business sectors. This flexibility in application demonstrates the versatility and market exploration potential of the REGEN Powertrain.



In-house production of complete vehicles + **Remanufacturing and parts sales**

FLEXIBLE Architecture

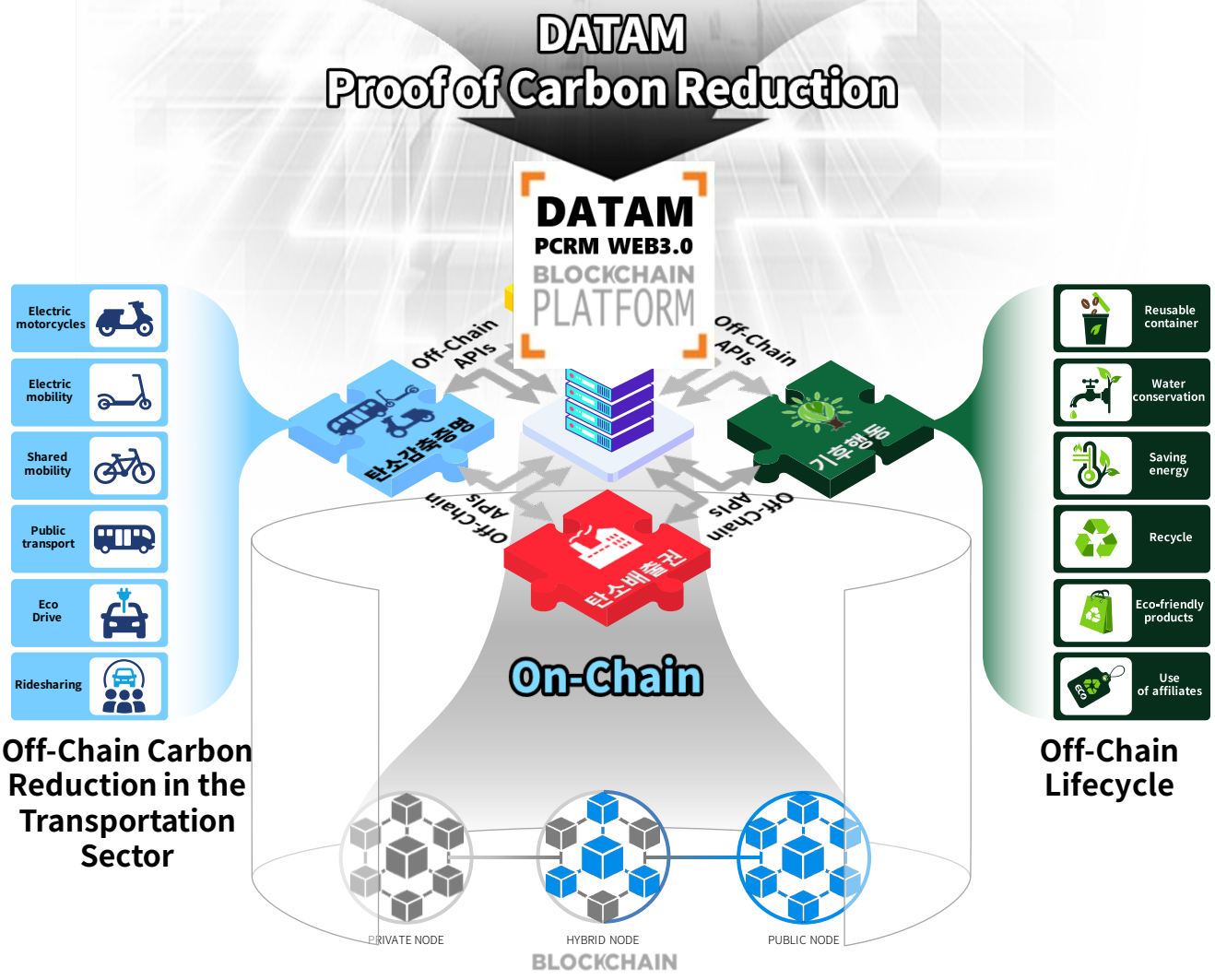
Product sales and carbon reduction certification business expansion (optimized for SDM methodology)

3. Off-Chain carbon reduction technology

Business diversification model for REGEN Powertrain

Manufacturing 	In-house production of finished vehicles	=	REGEN Grip Sensors	+ Controller	+ Motor (In-Wheel motor)	+ Battery (BMS)
remanufacturing 	Remanufacturing old motorcycles	=	REGEN Grip Sensors	+ Controller	+ Motor (In-Wheel motor)	+ Battery (BMS)
parts sales remanufacturing 	Remanufacture of existing electric motorcycles	=	REGEN Grip Sensors	+ Controller	+ Motor (In-Wheel motor)	
Partnership 	Technical cooperation and parts delivery	=	REGEN Grip Sensors	+ Controller		

DATAM Proof of Carbon Reduction



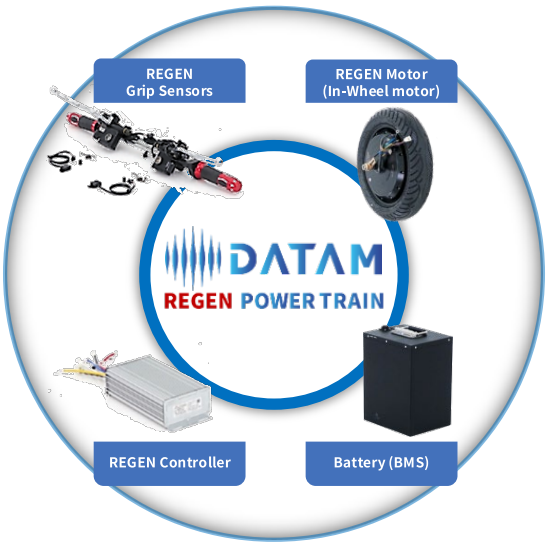
Off-Chain Carbon Reduction in the Transportation Sector

Off-Chain Lifecycle

3. Off-Chain carbon reduction technology

Off-Chain reduction-based technology

REGEN Powertrain



Two-wheeled transportation carbon reduction H/W, S/W

REGEN E-BUS

BRT (Bus Rapid Transit) carbon reduction H/W, S/W

EU Obtained TUV (EU) electromagnetic compatibility certification

(System For Collecting And Analyzing Big Data By Monitoring Car's And Road's Conditions

TÜV NORD

Certificate
of conformity to the following
European Directives

Registered No.:
K13125/E22

Electromagnetic Compatibility Directive 2014/30/EU

Reference or applicant	Date of application	File reference	Test report No.	Date of issue
-	09.05.2022	KP-22-218	K12890/E22	10.05.2022

This is to certify that the following products comply with the essential requirements (Annex 1) of the above mentioned European Directive and the following standard(s):

Product: SC-TELEMETRY-100

Type designation: SC-TELEMETRY-100

Applicant: DATAM KOREA CO., LTD.
#B-1401, 606, Seobusaet-gil, Geumcheon-gu, Seoul 08504, Korea

Manufacturer: Same as above

Standard(s): EN 301 489-1 V1.9.2
EN 50498:2010

This Certificate of conformity is based on the evaluation of samples of the product. It does not imply an assessment of the production and it does not permit the use of a mark of conformity or of a safety mark of the TÜV NORD GROUP. The holder of this certificate may use this Certificate together with his EC-Declaration of Conformity.

Yeung-Cheon Kim
Product Certification Business Unit
TÜV NORD KOREA LTD.

TÜV NORD Korea Ltd.
20 Dogok-ro 3-gil, Gangnam-gu
Seoul 06264, Korea
Tel.: +82-2-2188-0070
Fax: +82-2-556-3088
E-mail: tnk@tuv-nord.com

CE The CE marking can be affixed on the product if all relevant and effective Directives are complied with. CE

KC Obtained KC electromagnetic compatibility certification

System For Collecting And Analyzing Big Data By Monitoring Car's And Road's Conditions

2B35-C89A-8AA2-D66B

방송통신기자재등의 적합등록 필증

Registration of Broadcasting and Communication Equipments

상호 또는 성명 *Trade Name or Registrant*	주식회사 데이탐코리아
기자재명칭(제품명칭) *Equipment Name*	SC-TELEMETRY-100
기기부호/추가 기기부호 *Equipment code /Additional Equipment code*	MOB11 / LARN8
기본모델명 *Basic Model Number*	SC-TELEMETRY-100
파생모델명 *Series Model Number*	
등록번호 *Registration No.*	R-R-tAM-SC-TELEMETRY
제조자/제조국가 *Manufacturer/Country of Origin*	주식회사 데이탐코리아 / 한국
등록연월일 *Date of Registration*	2022-01-27
기타 *Others*	

위 기자재는 「전파법」 제58조의2 제3항에 따라 등록되었음을 증명합니다.
It is verified that foregoing equipment has been registered under the Clause 3, Article 58-2 of Radio Waves Act.

2022년(Year) 01월(Month) 28일(Day)

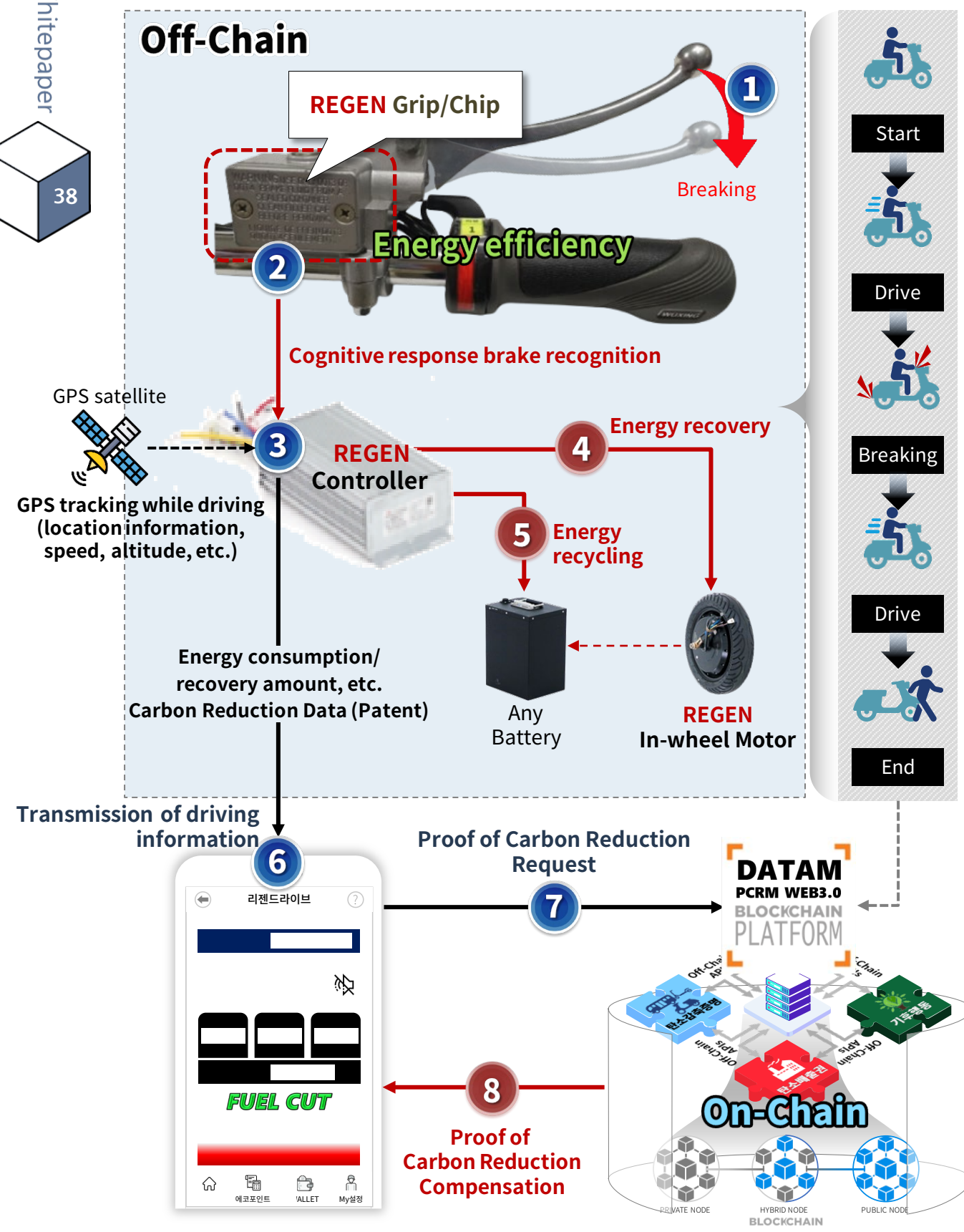
국립전파연구원장

Director General of National Radio Research Agency

※ 적합등록 방송통신기자재는 반드시 "적합성평가표시" 를 부착하여 유통하여야 합니다.
위반시 과태료 처분 및 등록이 취소될 수 있습니다.

3. Off-Chain carbon reduction technology

On-Chain integration of carbon reduction for REGEN Powertrain



3. Off-Chain carbon reduction technology

On-Chain integration of carbon reduction for REGEN E-BUS

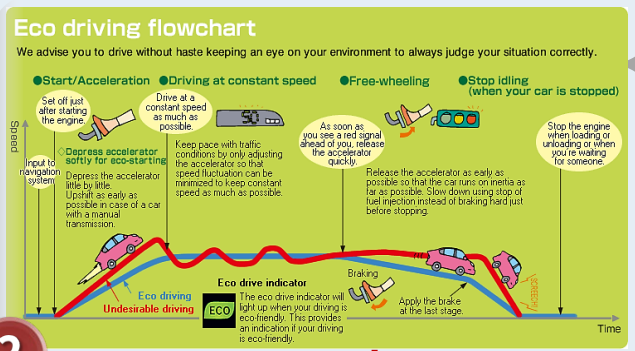
Off-Chain

BRT departure

1

GPS satellite

GPS tracking while driving (location information, speed, altitude, etc.)



2 Eco-driving awareness and guidance

Energy consumption/ recovery amount, etc. Carbon Reduction Data (Patent)

3 Energy recycling

Any Battery

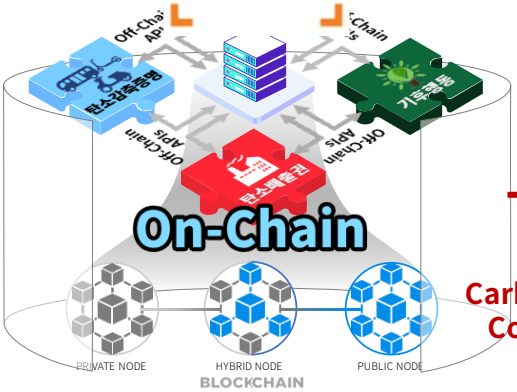
Transmission of driving information

4

Proof of Carbon Reduction Request

6

DATAM PCRM WEB3.0 BLOCKCHAIN PLATFORM



7

Proof of Carbon Reduction Compensation

5

Transmission of usage information

Use of eco-friendly

Start

Get In

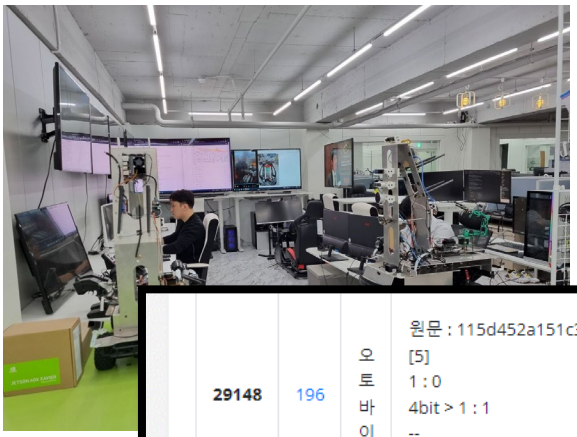
Get off

Change transport

End

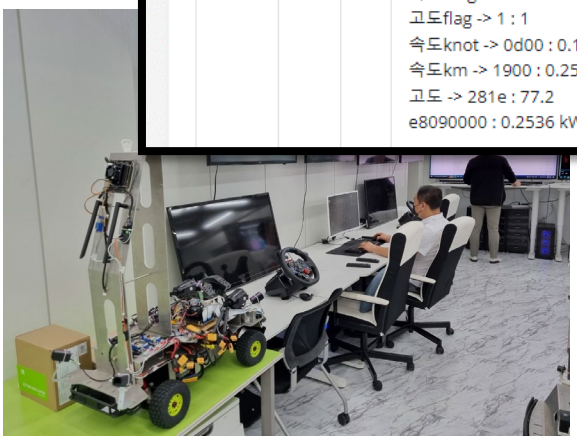
3. Off-Chain carbon reduction technology

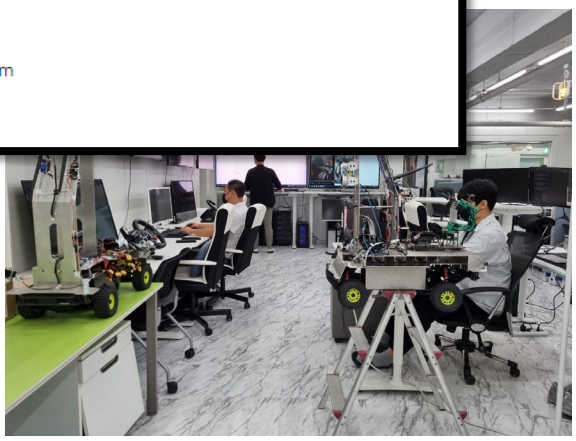
PCRM monitoring and control center

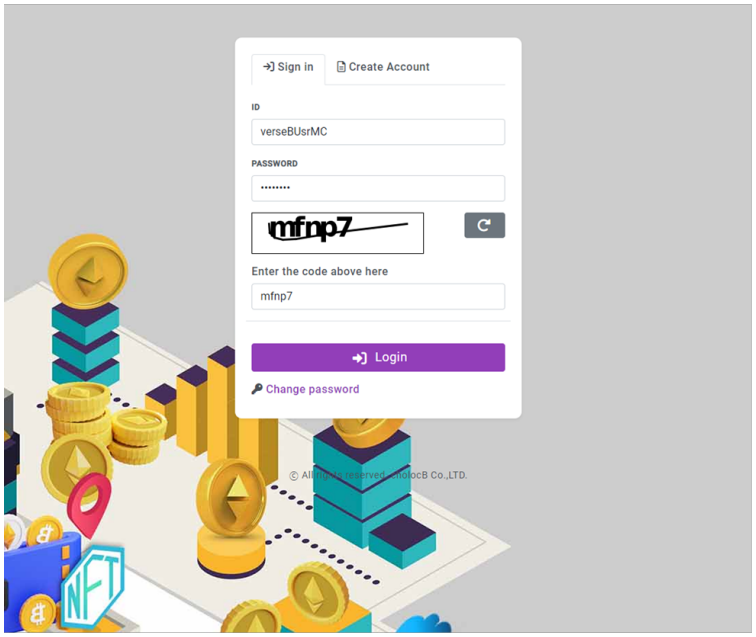


No.	채굴기 S/N	ReGen (회생 전력량)	탄소 감축 채굴량	누적 감축 채굴량	배출권 국제거래시세	채굴 PCR
278	807609123	1.0935 kWh	0.509571 kg CO2 eq	88.1299666 kg CO2 eq	117,306.09 원 / t	0.509571 PCR
277	807609123	1.0935 kWh	0.509571 kg CO2 eq	87.6203956 kg CO2 eq	117,306.09 원 / t	0.509571 PCR
276	807609123	1.0935 kWh	0.509571 kg CO2 eq	87.1108246 kg CO2 eq	117,306.09 원 / t	0.509571 PCR

29148	196	오토바이	원문 : 115d452a151c3b7a4c5a4904006bf50000110d001900281ee8090000 [5] 1 : 0 4bit > 1 : 1 -- 355091805 : 35.848634166667 1283078940 : 128.51315666667 date -> 5a490400 : 280922 time -> 6bf50000 : 62827 속도 flag -> 1 : 1 고도flag -> 1 : 1 속도knot -> 0d00 : 0.13 속도km -> 1900 : 0.25 km 고도 -> 281e : 77.2 e8090000 : 0.2536 kWh







MENU	OWNERSHIP
GENERAL	
DASHBOARD	
TRANSACTION	공용사용(로그인사용자 채널만 조회가능)
EXCHANGE STATUS	공용사용(로그인사용자 채널만 조회가능)
WITHDRAW STATUS	공용사용(로그인사용자 채널만 조회가능)
FX MANAGEMENT	
EXCHANGE FX	공용사용(로그인사용자 채널만 조회가능)
WITHDRAW FX	공용사용(로그인사용자 채널만 조회가능)
ADRESS(WALLET)	
EXCHANGE ADDRESS	공용사용(로그인사용자 채널만 조회가능)
WITHDRAW ADDRESS	공용사용(로그인사용자 채널만 조회가능)
CHANNEL CUSTOMER	공용사용(로그인사용자 채널만 조회가능)
MY INFO	공용사용(로그인사용자 채널만 조회가능)
SUPERVISOR	
TXN MANAGEMENT	
TRANSACTION	공용사용 (전체 채널 조회 가능)
EXCHANGE	공용사용 (전체 채널 조회 가능)
WITHDRAW	공용사용 (전체 채널 조회 가능)
EXCHANGE(DAILY)	SUPERVISOR 전용
WITHDRAW(DAILY)	SUPERVISOR 전용
TRANSFERENCE	
EXCHANGE FX	공용사용 (전체 채널 조회 가능)
WITHDRAW FX	공용사용 (전체 채널 조회 가능)
WALLET	
EXCHANGE ADDRESS	공용사용 (전체 채널 조회 가능)
WITHDRAW ADDRESS	공용사용 (전체 채널 조회 가능)
CHANNEL	
CHANNEL INFO	SUPERVISOR 전용
CHANNEL USER	SUPERVISOR 전용
SYSTEM	
BUSINESS DATE	SUPERVISOR 전용
WALLET NODE	SUPERVISOR 전용
CODE INFO	SUPERVISOR 전용
ERROR MESSAGE	SUPERVISOR 전용

4. Carbon Reduction Mining

PCR BLOCKCHAIN NETWORK

Proof of carbon reduction for CRM mining is based on the consumption of resources and energy, which requires actions and methods that consume less than the usual usage, known as the baseline. This means that carbon reduction mining, or CRM, is achieved by consuming resources and energy below the baseline. The baseline should be reasonable and objective, and there should be a baseline for each specific item to accurately quantify the amount of reduction by comparing it to the baseline using quantitative measurement methods.

By comparing the consumption of resources and energy to the baseline, it is possible to quantitatively measure the carbon emissions reduction achieved through CRM. Therefore, it is also possible to calculate the amount of carbon reduction corresponding to the savings achieved through CRM. The process of accurately determining and certifying the carbon emissions reduction based on the amount of resources and energy saved through CRM is known as Proof of Carbon Reduction (PCR). The PCR reward system is a mechanism that provides compensation based on certain criteria for the carbon emissions reduction verified through PCR. In this system, compensation is provided in the form of PCRM tokens, and the PCR reward system for CRM is implemented within the PCR BLOCKCHAIN NETWORK.

In essence, the PCR BLOCKCHAIN NETWORK is a system implemented on a Private blockchain network using the Raft algorithm and Hyper Ledger Fabric, which enables performance improvement through Federated Learning. Within this network, the carbon reduction ecosystem, known as the Carbon Reduction Combinations, is formed through carbon reduction proof contracts. The system operates by executing contracts based on a methodology that quantifies the amount of carbon reduction resulting from users' carbon reduction actions, thereby providing rewards to the users.

This system is designed with a decentralized and distributed network environment based on cross-layer architecture, which avoids the need for a large-scale centralized processing and storage system. It operates on idle resources available from legacy systems and mobile phones when they are in idle status or engaged in low-load tasks. Therefore, it can prevent excessive power consumption, carbon emissions, and electronic waste generation that are associated with the processing of collected data and execution of smart contracts through IoT devices or apps.

In the long term, this system helps create an ecosystem where participants in the carbon reduction consortium can receive rewards based on carbon reduction methodologies that are ① scientifically proven and ② approved through voting within the consortium, in addition to the carbon reduction methodologies proposed and approved by UNFCCC. The characteristic of "Business agreement between participants" through consensus is an important feature of the PCR BLOCKCHAIN NETWORK, as it serves as both a Private blockchain network and a Consortium blockchain network.

Furthermore, each member of the carbon reduction consortium can utilize the rewarded cryptocurrency to lease, purchase, and exchange all the goods they produce and consume individually. This serves as an important means to maintain a sustainable ecosystem where the gathered members, based on carbon reduction proofs, can sustain a healthy and mutually beneficial environment.

Expansion of CRM Monitoring System

The main carbon reduction projects being carried out by DATAM are in the transportation sector. DATAM's carbon reduction projects in the transportation sector strictly adhere to the CDM methodologies that are thoroughly registered with UNFCCC. Currently, there are a total of 23 registered CDM methodologies for transportation projects (Table 1).

Table 1. Transportation sector CDM methodology

Scope Number	Sectoral Scope	Methodology	Approved Small Scale Methodologies	Approved Consolidated Methodologies	DOEs accredited for validation	DOEs accredited for verification
7	Transport	AM0031 AM0090 AM0101 AM0110 AM0116	AMS-I.M. AMS-III.AA. AMS-III.AK. AMS-III.AP. AMS-III.AQ. AMS-III.AT. AMS-III.AY. AMS-III.BC. AMS-III.BM. AMS-III.BN. AMS-III.BO. AMS-III.BP. AMS-III.C. AMS-III.S. AMS-III.T. AMS-III.U.	ACM0016 ACM0017	AENOR BVCH BVI CCCI CCSC CEC CQC CTI EPIC Earthood ICONTEC KBS KEA KEMCO LRQA RINA TÜV NORD TÜV SÜD	AENOR BVCH BVI CCCI CCSC CEC CQC CTI EPIC Earthood ICONTEC KBS KEA KEMCO LRQA RINA TÜV NORD TÜV SÜD

Source: UNFCCC, https://cdm.unfccc.int/DOE/scopes.html#7

Among them, the methodologies for the transition to energy-efficient transportation systems such as AM0031 (BRT), ACM0016 (MRTs), and AMS-III.C. (electric/hybrid vehicles) account for two-thirds of the total registered projects. Most of the projects being pursued by DATAM PCRM also fall under these methodologies.

It is the monitoring of energy consumption to calculate the baseline emissions and project emissions in transportation transition projects. In other words, a clear and scientifically measurable, reportable, and verifiable (MRV) system must be adopted to measure and compare the energy consumption between the existing vehicles or transportation systems and the converted ones.

If it is possible to monitor the energy consumption of vehicles in real-time, it can be extremely useful in various fields. Estimating the CO_2 emissions of different vehicles at specific locations on the road enables the creation of valuable policies to reduce energy consumption in vehicles, roads, and traffic situations. Furthermore, it allows for the management of energy usage in the entire transportation system, including roads, cars, fuel, and electricity.

The DATAM PCRM project aims to achieve carbon reduction through the overall transportation methodology of UNFCCC, as well as apply carbon reduction proof to everyday climate actions, with the goal of promoting the continuous expansion of the ecosystem.

Patent for Deep Learning Carbon Reduction Measurement

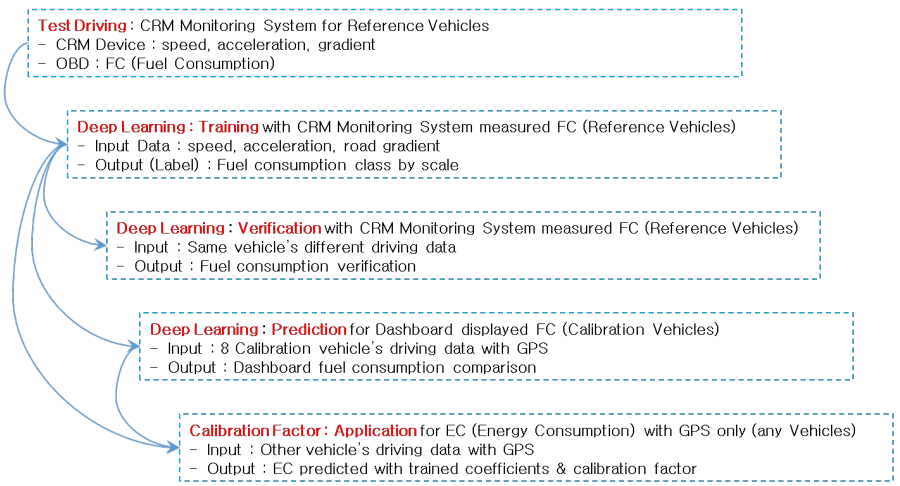
Due to the variety of transportation modes and unpredictable traffic situations, real-time monitoring of energy consumption on actual roads is nearly impossible. It requires the installation of devices that measure the fuel/electricity consumption rates for gasoline, diesel, and electric vehicles. While it is possible to read average fuel efficiency values displayed on vehicle dashboards, this is not an effective monitoring method as it requires recording the values and inputting them into all monitoring systems.

Vehicles are equipped with an OBD (On Board Diagnostics) connection port for diagnostics and maintenance purposes, and it is possible to read fuel consumption using an OBD scanner. However, this method is not suitable for monitoring purposes as it requires expensive and appropriate scanners, and the location and form of the OBD port vary across different vehicles.

To overcome these limitations, DATAM has developed a CRM (Carbon Reduction Mining) monitoring system that applies deep learning technology to actual GPS data collected during road driving, enabling accurate real-time fuel consumption (FC) estimation. The CRM device, regardless of the vehicle type, is a device that can be installed simply by connecting it to power, and it collects and transmits real-time data such as vehicle speed, acceleration, and road gradient obtained from the built-in GPS and communication modules. The data automatically transmitted to the server is processed through deep learning, resulting in the estimation of the vehicle's energy consumption and CO_2 emissions.

Figure 1 represents the process of monitoring a vehicle's energy consumption through deep learning. It consists of the following steps: 'Test Driving - Deep Learning Training (Labeled FC) - Deep Learning Verifying (Labeled FC) - Deep Learning Predicting (Average FE) - Calibrating (Average FE).' This process can be applied to derive appropriate fuel consumption for internal combustion engine vehicles and predict energy consumption for electric vehicles. While it may not accurately display the vehicle's dynamics as mechanical methods do, it can be highly useful by utilizing deep learning and simple calibration coefficients from test vehicles to train and reach the average fuel economy (FE) value based on the FC labels of reference vehicles.

Fig 1. The process of energy consumption monitoring of vehicles by deep learning.



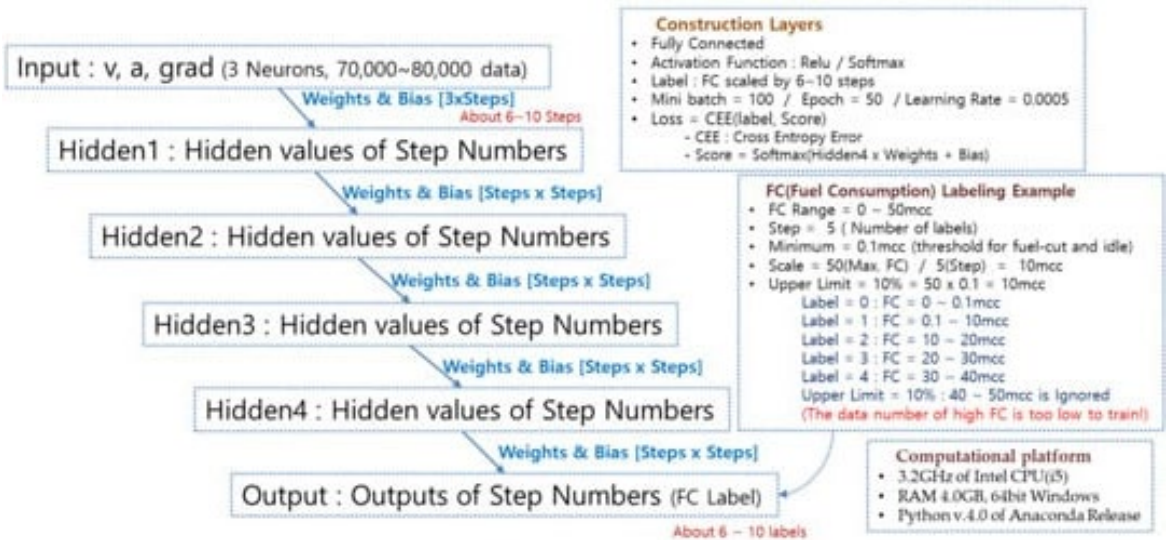
4. Carbon Reduction Mining

Patent for Deep Learning Carbon Reduction Measurement

Patent-based Deep learning was applied as a method to obtain accuracy in carbon reduction proof and precision in measuring, reporting, verifying (MRV), and calculating fuel consumption (FC) through various high-precision parameters.

The measurement data from the CRM device of the reference vehicle is used to train parameters through Deep learning. The input data consists of vehicle speed, acceleration, and road gradient, while the output data is fuel consumption (FC). Fig. 2 shows the deep learning layer structure for training the parameters (weights and biases) to estimate FC using the input data. It consists of four hidden layers, forming a 5-layer deep learning structure. The output or label is the FC data, which is divided into scale factors to create labels. The number of labels is approximately 6-8 in the deep learning structure.

Fig 2. Deep-learning layers construction and the hyper-parameters.



One of the proposed methods for estimating Fuel Consumption (FC) in previous studies involves calculating the engine output by multiplying the vehicle speed with the driving resistance, which consists of aerodynamic resistance, rolling resistance, gradient resistance, and acceleration resistance. The power is generated when the fuel is combusted (consumed) in the engine combustion chamber and is finally transmitted to the tires through the powertrain gear and accelerator. The estimation process can be briefly explained as follows.

$$R_{friction} = \text{Relu}(\text{Input} \times \text{Weight1} + \text{Bias1})$$

$$R_{aerodynamic} = \text{Relu}(\text{Hidden1} \times \text{Weight2} + \text{Bias2})$$

$$R_{gradient} = \text{Relu}(\text{Hidden2} \times \text{Weight3} + \text{Bias3})$$

$$R_{inertia} = \text{Relu}(\text{Hidden3} \times \text{Weight4} + \text{Bias4})$$

$$R_{total} = \text{Softmax}(\text{Hidden4} \times \text{Weight5} + \text{Bias5})$$

$$P = \text{CEE}(\text{Output}, \text{Label})$$

$$FC = \begin{cases} \xi P \text{ for Normal driving} \\ FC_{idle} \text{ for Idling state} \\ 0 \text{ for Fuel-cut state} \end{cases}$$

μ: Tire-road surface rolling friction coefficient;
W: Vehicle weight [kg];
g: Gravitational acceleration [=9.8 m/s2];
CD: Drag coefficient;
ρ: Air density [kg/m3];
A: Vehicle frontal area [m2];
v: Vehicle speed [m/s];
θ: Road gradient [degree];
a: Vehicle acceleration [m/s2];
η: Power transfer efficiency;
ξ: Fuel-power conversion factor [mcc/Watt/s];
R: Resistance force [N];
P: Engine power [Watt];
FC: Fuel consumption [mcc/s];
FCidle: Fuel consumption in idle state [mcc/s].

Patent for Deep Learning Carbon Reduction Measurement

Fuel Consumption (FC) does not remain constant but fluctuates up and down depending on changes in fuel injection areas such as fuel cutoff, idle, acceleration, and warm-up during driving. To estimate FC using deep learning, the procedure is transformed from a regression problem to a classification problem. Therefore, an appropriate labeling system is required to train the parameters for estimating FC values. The calculation process for each layer is as follows.

$$\text{Hidden1} = \text{Relu}(\text{Input} \times \text{Weight1} + \text{Bias1}) \quad (1)$$

$$\text{Hidden2} = \text{Relu}(\text{Hidden1} \times \text{Weight2} + \text{Bias2}) \quad (2)$$

$$\text{Hidden3} = \text{Relu}(\text{Hidden2} \times \text{Weight3} + \text{Bias3}) \quad (3)$$

$$\text{Hidden4} = \text{Relu}(\text{Hidden3} \times \text{Weight4} + \text{Bias4}) \quad (4)$$

$$\text{Output} = \text{Softmax}(\text{Hidden4} \times \text{Weight5} + \text{Bias5}) \quad (5)$$

$$\text{Loss} = \text{CEE}(\text{Output}, \text{Label}) \quad (6)$$

$$\text{Relu}(x) \quad Maximum(0, x) \quad (7)$$

$$\text{Softmax}(x_i) \quad exp(x_i)/sum\ of\ exp(x_i) \quad (8)$$

$$CEE(x_i, y_i) = Cross\ Entropy\ Error(x_i, y_i) = Average\ of\{-log_e(x_i \times y_i)\} \quad (9)$$

$$W_{i+1} = W - \eta \times G_i \quad (10)$$

W: weights or bias
η : learning rate (0.0005)
G : gradient of Loss per W

$$G_i = \frac{\partial \text{Loss}}{\partial W_i} \quad (11)$$

In (6), the 'Loss' value is minimized by the gradient descent method in the deep learning process as follows.

$$\text{Calibration Factor} = \frac{CFE_{test}}{CFE_{reference}} + \frac{(MY_{test} - MY_{reference})}{30} \quad (12)$$

CFE : Certified Fuel Economy
MY : Model year

$$FE = FE_{Deep\ Learning} \times Calibration\ Factor \quad (13)$$

Patent for Deep Learning Carbon Reduction Measurement

The carbon emissions emitted by a vehicle during actual road travel are calculated based on the FC (Fuel Consumption) derived from the CRM (Carbon Reduction Mining) monitoring system, which is based on deep learning technology.

For internal combustion engine vehicles,

$$E\ (kg\ CO_2 eq\ ) = Energy\ Consumption(L) \times\ Fuel\ Calorific\ Value(MJ/L) \times Carbon\ Emission\ Factor(kg\ C/GJ) \times \frac{1}{1000}\ \times \frac{44}{12}$$

Fuel	Calorific Value (MJ/L)	Carbon Emission Factor(kg C/GJ)
Gasoline	32.6	19.548
Diesel	37.7	20.111
LPG	25.3	17.454

For electric vehicles,(Power emission factor (Korea Environmental Corporation, 2018): 0.466 kg CO_2 eq/kWh)

$$E\ (kg\ CO_2 eq\ ) = Energy\ consumption(kWh) \times power\ emission\ factor(kg\ CO_2/kWh\ )$$

For example, if we assume that a gasoline vehicle is converted to an electric vehicle as a transportation mode, and both vehicles are driven for the same distance of 20,000 km/year, with the gasoline vehicle consuming 2,000 liters (L) and the electric vehicle consuming 4,000 kilowatt-hours (kWh) of energy, the carbon reduction can be calculated as follows:

1) Base Line Emission

$$E\ (kg\ CO_2 eq\ ) = Energy\ Consumption(L) \times\ Fuel\ Calorific\ Value(MJ/L) \times Carbon\ Emission\ Factor(kg\ C/GJ) \times \frac{1}{1000}\ \times \frac{44}{12}$$

$$= 2{,}000(L) \times\ 32.6(MJ/L) \times 19.548(kg\ C/GJ) \times \frac{1}{1000}\ \times \frac{44}{12} = 4{,}673\ kg\ CO_2 eq$$

2) Project Emission

$$E\ (kg\ CO_2 eq\ ) = Energy\ consumption(kWh) \times power\ emission\ factor(kg\ CO_2/kWh\ )$$
$$= 4{,}000(kWh) \times 0.466(kg\ CO_2/kWh\ ) = 1{,}864\ kg\ CO_2 eq$$

3) Carbon Reduction

$$\Delta E\ (kg\ CO_2 eq\ ) = 4{,}673\ kg\ CO_2 eq - 2{,}330\ kg\ CO_2 eq = \mathbf{2{,}8093\ kg\ CO_2 eq}$$

In this way, energy consumption through transportation mode conversion is saved, and for the saved energy, carbon reduction is certified, recorded, and stored in the PCR BLOCKCHAIN NETWORK, and PCRM tokens are provided as compensation.

4. Carbon Reduction Mining

Deep Learning Carbon Reduction Proof Baseline

Use of electricity, waterworks, and city gas

BASELINE

Activity data
X EF
= Base Line emissions (kg CO_2 eq)

Energy source	EF (Emission Factor) Korea Environment Corporation 2018
Power	0.466 kg CO_2 eq/kWh
Water works	0.332 kg CO_2 eq/m^3
Gas	2.264 kg CO_2 eq/m^3

Greenhouse Gases by Vehicle Fuel

BASELINE

Fuel efficiency(L/km)
X Driving distance(km)
X Heat value(MJ/L)
X EF(kg C/GJ)
X 1/1000
X 44/12
= Base Line emissions (kg CO_2 eq)

Energy source	Heat value (MJ/L)	EF (kg C/GJ)
Gasoline	32.6	19.548
Diesel	37.7	20.111
LPG	25.3	17.454

Greenhouse Gases of Electric Vehicles

BASELINE

Fuel efficiency(L/km)
X Driving distance(km)
X EF(kg CO_2 /kWh)
= Base Line emissions (kg CO_2 eq)

Energy source	EF (Emission Factor) Korea Environment Corporation 2018
Power	0.466 kg CO2 eq/kWh

GHG emissions according to renewable energy generation

BASELINE

Power generation(kWh)
X EF(kg CO_2 /kWh)
= Base Line emissions (kg CO_2 eq)

Energy source	EF (Emission Factor) Korea Environment Corporation 2018
Power	0.466 kg CO_2 eq/kWh

5. Global standardization strategy

5. Global standardization strategy

Application of Idle Stop & Go (ISG) System using CDM Methodology

Major countries in carbon neutrality declaration including Korea

Expansion of carbon reduction policy in the transport sector

1. **The increase in the participation of carbon-neutral countries has led to the expansion of carbon reduction efforts in various sectors.**
2. **The era of electrification in internal combustion engine transportation is dawning.**
3. **Issues in converting internal combustion engine motorcycles to electrification**
4. **Rapid increase in waste due to conversion to electrification of internal combustion engine motorcycles**

The strengthening of carbon reduction policies in major advanced countries and emerging economies.

Mandatory installation of Idle Stop and Go (ISG) in the EU.

UNFCCC application methodology	[AMS-III.AP]	Transport energy efficiency activities using post - fit Idling Stop device

- ✓ Effective from September 2019, it is mandatory for all new passenger cars and light commercial vehicles sold in the EU to be equipped with the "ISG" system as a standard requirement, aiming at reducing CO_2 emissions and improving fuel efficiency.
- ✓ By 2020, specific emission targets were set for new cars and vans, aiming for 95g of CO_2 per kilometer for cars and 147g of CO_2 per kilometer for vans.

Stronger carbon emission regulations are expected for over 500 million in-use internal combustion engine motorcycles in countries including the EU, Southeast Asia, and the Indian-Chinese peninsula, among other developing and emerging economies.

※ **ISG stands for Idle Stop and Go, which is a system that automatically shuts off the engine when the vehicle is stationary (e.g., at a traffic light) and restarts it when the driver wants to move again.**

Global Standardization of Transportation Mode Conversion Projects

The competitiveness of this project lies in its combination of carbon reduction in sectors that are difficult for other companies to approach, and strict adherence to the UNFCCC-registered CDM (SDM) methodologies is essential for carbon reduction projects in the transportation sector.

There are a total of 23 SDM (CDM) methodologies registered with UNFCCC, and among them, transportation projects involving the transition to energy-efficient transportation systems account for two-thirds of the total.

Since the majority of projects being implemented in this venture fall under UNFCCC methodologies, there is a clear possibility of acquiring Certified Emission Reductions (CERs), ensuring competitiveness.

Div.	SDM(CDM) methodology	Type
AM0090	Modal shift in transportation of cargo from road transportation to water or rail transportation	energy efficiency
AM0031	**Bus rapid transit projects**	**energy efficiency**
ACM0016	**Mass Rapid Transit Projects**	**energy efficiency**
AM0101	High speed passenger rail systems	energy efficiency
AMS III.U.	Cable Cars for Mass Rapid Transit System (MRTS)	energy efficiency
AM0110	Modal shift in transportation of liquid fuels	energy efficiency
AM0116	Electric taxiing systems for airplanes	energy efficiency
AMS-III.AA.	Transportation Energy Efficiency Activities using Retrofit Technologies	energy efficiency
AMS-III.AP.	**Transport energy efficiency activities using post - fit Idling Stop device**	**energy efficiency**
AMS-III.BM	Lightweight two and three wheeled personal transportation	energy efficiency
AMS-III.BN	Efficient operation of public transportation	energy efficiency
AMS-III.BO	Trip avoidance through equipment improvement of freight transport	energy efficiency
AMS-III.AT.	Transportation energy efficiency activities installing digital tachograph systems to commercial freight transport fleets	energy efficiency
AMS-III.C.	**Emission reductions by electric and hybrid vehicles**	**fuel conversion**
AMS-III.S.	Introduction of low-emission vehicles/technologies to commercial vehicle fleets	fuel conversion
AMS-III.AY.	Introduction of LNG buses to existing and new bus routes	fuel conversion
AMS-III.BC.	Emission reductions through improved efficiency of vehicle fleets	fuel conversion
AMS-III.BP.	Emission reduction by shore-side electricity supply system	fuel conversion
ACM0017	Production of biofuel	Renewable Energy
AMS-Ⅰ.M.	Solar power for domestic aircraft at-gate operations	Renewable Energy
AMS-III.T.	Plant oil production and use for transport applications	Renewable Energy
AMS-III.AK.	Biodiesel production and use for transport applications	Renewable Energy
AMS-III.AQ.	Introduction of Bio-CNG in transportation applications	Renewable Energy

DATAM's project and applied CDM methodology

Projects	Promotion country	Relevant methodology
E-BUS BRT public transportation system	VIETNAM	M0031, ACM0016, AMS-III.C.
Electric tuk-tuk taxi supply business	LAOS	M0031, ACM0016, AMS-III.C
Building an electric motorcycle delivery platform	INDONESIA, VIETNAM	AMS-III.C
Electric motorcycle remanufacturing	INDONESIA, VIETNAM	AMS-III.C
Electric motorcycle regenerative braking system	Global	AMS-III.AP

5. Global standardization strategy

Global Registration of Carbon Reduction Methodologies for Transportation Mode Conversion

Indonesia REGEN powertrain SDM methodology registration

NUJEK is a transportation and delivery platform in Indonesia with 25,000 riders.

1st 450 carbon reduction methodology registration

"They say that cow farts are also subject to carbon tax?"

Is the delivery platform company engaged in carbon reduction?

While the delivery platform company is not obligated to reduce carbon emissions due to manufacturing or other factors, there is an anticipated future obligation to reduce emissions from the primary means of transportation used for delivery purposes, such as motorcycles (ongoing initiative).

nujek

https://www.nujek.id/

Transition of transportation modes.

DATAM × UNFCCC

SDM METHODOLOGY
GLOBAL STANDARD

Carbon reduction.

Registration of UNFCCC SDM Methodologies ➡ "Global Standardization"

Global dissemination through standardization of carbon reduction technologies.

Promotion of mandatory installation of REGEN Powertrain

6. PCRM Blockchain Business

Business direction

Business progress status (As of 2023)

Promotion of business with the goal of occupying the global market in the early stages

- Promotion of projects targeting Southeast Asian countries such as Indonesia, Vietnam, the Philippines, and India, as well as countries in the Indochina Peninsula, etc.
- Implementation of business activities for the remanufacturing of conventional internal combustion engine motorcycles into electric motorcycles, involving government agencies, state-owned enterprises, large corporations, and platform companies in each country.
- Development of popular electric motorcycles and convergence of new brand Regen powertrain
- **Promotion of registration of UNFCCC carbon reduction methodologies through the business conversion of delivery motorcycles into environmentally friendly transportation vehicles.**
- **In the side event technology demonstration test held in Bali, Indonesia during the G20 in November 2022, a 56.7% efficiency improvement was achieved and demonstrated.**
- **During the visit of the President to Vietnam in December 2022, an alternative project was proposed as a means to achieve the national greenhouse gas reduction target (NDC).**

Future business direction

Promoted as an alternative project to achieve the National Greenhouse Gas Reduction Target (NDC)

- NDC alternative carbon reduction methodology consulting and business promotion for countries in Southeast Asia and Indochina, such as Vietnam, Indonesia, the Philippines, and Laos

Registered and globalized UNFCCC CDM (SDM) methodology based on its product

- Technology standardization with new carbon reduction technology for each country of Regen powertrain
- Global expansion through UNFCCC CDM (SDM) methodology registration
- **When adopting technology standardization, such as the installation of EU ISG, other companies can strengthen our competitiveness and expand the market due to high entry barriers**

Continued expansion of new profitable businesses based on carbon emission reduction

- **By 2030, supplying Regen powertrains to 150 million units, or about 15% of the total 1 billion existing internal combustion engine motorcycles in China, India, Vietnam, Indonesia, and the Philippines.**
- **By reducing 150 million tons of CO_2 per year based on the Regen powertrain, the final goal is to achieve KRW 4.5 trillion in carbon credits per year based on the price of carbon credits.**

6. PCRM Blockchain Business

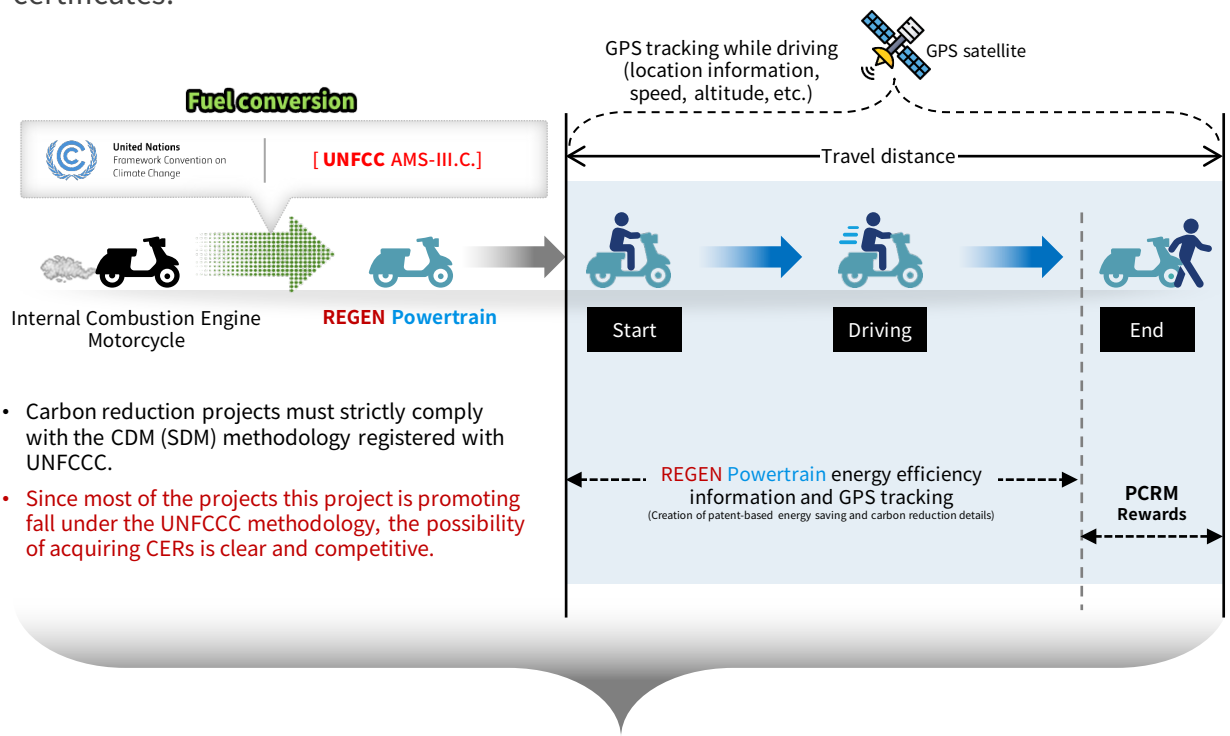
PCRM Global Carbon Reduction Proof Progress

	Status	Notes
KOREA	• Identifying business models for applying global carbon reduction methodologies. • Establishing and operating a carbon reduction certification system. • Proceeding with domestic production and refurbishment of REGEN Powertrain. • Developing a self-regulating carbon emission trading system and verification methodology.	• REGEN PowerTrain • PCRM
INDONESIA	• Development contract for REGEN Powertrain refurbishment (Indonesian Ministry of Industry Energy Research Institute). • Progress in registering the first carbon emission reduction methodology for transportation and delivery platform NUJEK New Rider. • Memorandum of Agreement (MOA) signed with national automobile company "MAB" for the development of mass-market electric motorcycles. • Agreement signed with major electric two-wheeler production company "United Bike." • Joint venture agreement with refurbishment certification company "ELDERS" for refurbishment business.	• REGEN PowerTrain • PCRM
VIETNAM	• In the process of revising the "Implementation Order for the Refurbishment of Internal Combustion Engine Motorcycles" to promote electrification. • Proposal for refurbishment of approximately 300,000 motorcycles seized for non-payment by the National Police Agency. • Project proposal for achieving Vietnam's NDC (Nationally Determined Contributions) in December 2022. • Collaboration with UNDP (United Nations Development Programme) for the establishment of the Ho Chi Minh BRT (Bus Rapid Transit) system and promotion of GCF (Green Climate Fund) project commercialization.	• REGEN PowerTrain • E-BUS(BRT) • PCRM
PHILIPPINES	• In September 2022, a major government project proposal (by KBL Party) and MOA (Memorandum of Agreement) for electrification conversion were signed. It is estimated that the number of motorcycles and tricycles subject to refurbishment will be over 8 million units.	• REGEN PowerTrain • PCRM
LAOS	• The Lao government has signed a contract for the electrification conversion project of internal combustion engine taxis, specifically Tuk-Tuks.	• TUK-TUK E-TAXI • PCRM
INDIA	• There is an agreement between INDURE company in India and REGEN for the establishment of a remanufacturing factory and component factory for REGEN powertrains. The agreement also includes the establishment of nationwide distribution channels and supply networks in India.	• REGEN PowerTrain • PCRM

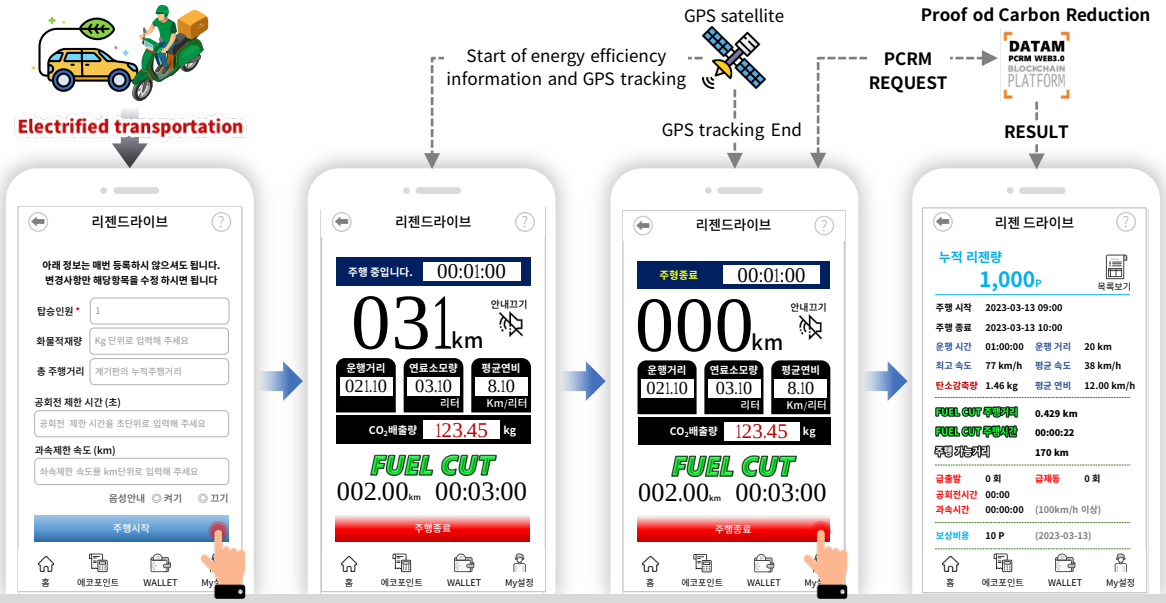
6. PCRM Blockchain Business

REGENDRIVE

REGENDRIVE is a technology-based on patented hardware and software that enables fuel conversion and energy efficiency in transportation. It utilizes mobility data, such as energy efficiency and GPS tracking information, to perform Measurement, Reporting, and Verification (MRV) of carbon reduction activities. This information is integrated into the PCRM XTE WEB3.0 BLOCKCHAIN PLATFORM to provide off-chain carbon offset verification and rewards through on-chain carbon reduction certificates.



- Carbon reduction projects must strictly comply with the CDM (SDM) methodology registered with UNFCCC.
- Since most of the projects this project is promoting fall under the UNFCCC methodology, the possibility of acquiring CERs is clear and competitive.



Indonesia REGEN Powertrain Project

- June 2022, government project proposal (Electric Vehicle Association and Presidential Office)
- November 15-16, 2022 Bali G20 meeting site event (REGEN technology introduction and demonstration test to achieve NDC in transportation sector) http://www.gvalley.co.kr/news/articleView.html?idxno=607177
- Ministry of Commerce, Industry and Energy Electric Motorcycle Research Institute Technology Demonstration (Technical Joint Prototype Production Contract)
- Signed technical cooperation with Indonesia's major electric vehicle and electric motorcycle manufacturers

Ministry of Industry REPUBLIC OF INDONESIA · IIEE Indonesian Institute for Energy Economics · WIKA · Elders · PT MOBIL ANAK BANGSA INDONESIA · nujek · Bakrie · UNITED bike

♻ **An MOA (Memorandum of Agreement) has been signed between MAB, the national automotive company of Indonesia, and the government, for the development of a mass-market electric motorcycle.**

- https://politicanews.id/datam-korea-co-ltd-dan-pt-motor-anak-bangsa-moa-pengembangan-sepeda-motor-listrik-nasional/

♻ **An agreement has been reached between NUJEK, the transportation and delivery platform in Indonesia, for the transition of their vehicles to alternative modes of transportation.**

- https://news.republika.co.id/berita/rg1tmx456/dukung-ekosistem-kendaraan-listrik-di-indonesia-nujek-gandeng-datam-asal-korea
- https://www.youtube.com/watch?v=-zX2BXHA4ZY
- https://opsi.id/read/dukung-ekosistem-kendaraan-listrik-indonesia-nujek-dan-datam-jalin-kerja-sama
- https://timesindonesia.co.id/ekonomi/247619/perusahaan-korea-datam-technology-umumkan-kerjasama-dengan-nusantara-ojek
- https://infonews.id/baca-515-nujek-gandeng-datam-siap-saingi-gojek-dan-grab

♻ **An agreement has been signed with "United Bike," the largest electric motorcycle manufacturing company in Indonesia.**

- http://www.it-b.co.kr/news/articleView.html?idxno=65118

♻ **Agreements and contracts have been signed with companies related to two-wheeled transportation in Indonesia.**

WIKA · Elders · Bakrie

Vietnam REGEN Powertrain Project

- In May 2022, a proposal for the refurbishment of electric motorcycles was submitted to the Ministry of Environment and Ministry of Justice, as well as the Prime Minister's Office in Vietnam. The proposal aimed to address the issue of approximately 300,000 impounded motorcycles by the Vietnamese National Police through a refurbishment project.

Philippine REGEN Powertrain Project

- In September 2022, a major government project proposal (by KBL Party) was submitted, and a Memorandum of Agreement (MOA) was signed.

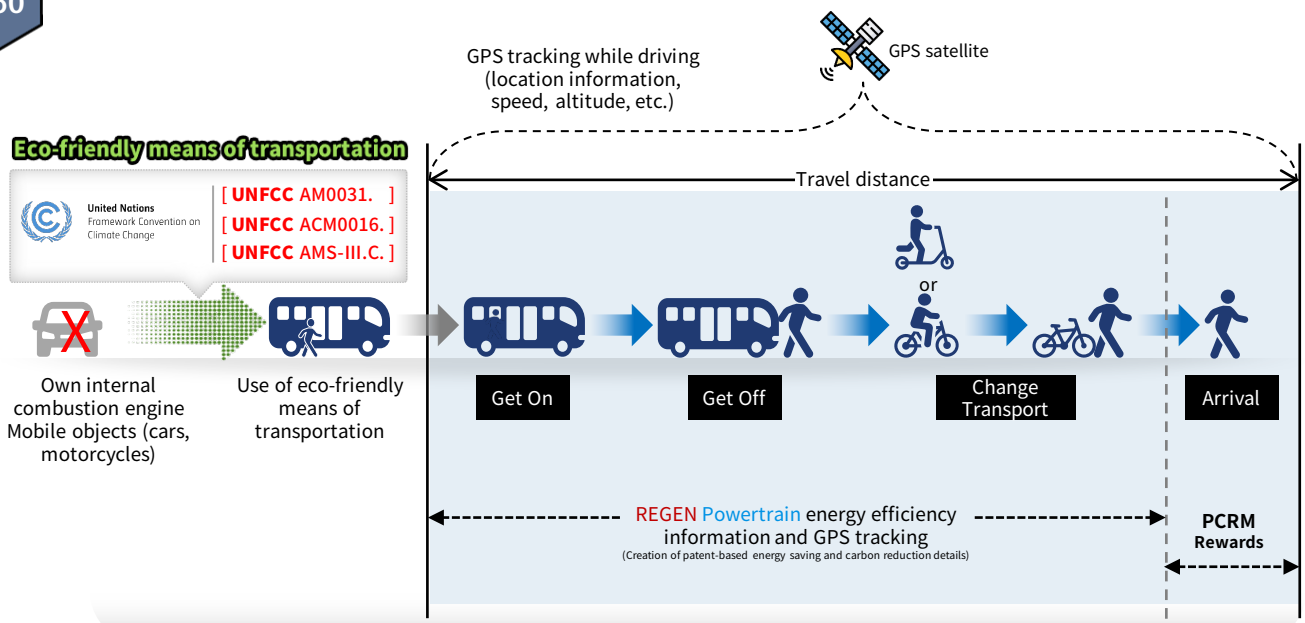
Tricycles, which are a major mode of transportation in the Philippines, are estimated to be more than 8 million in number.

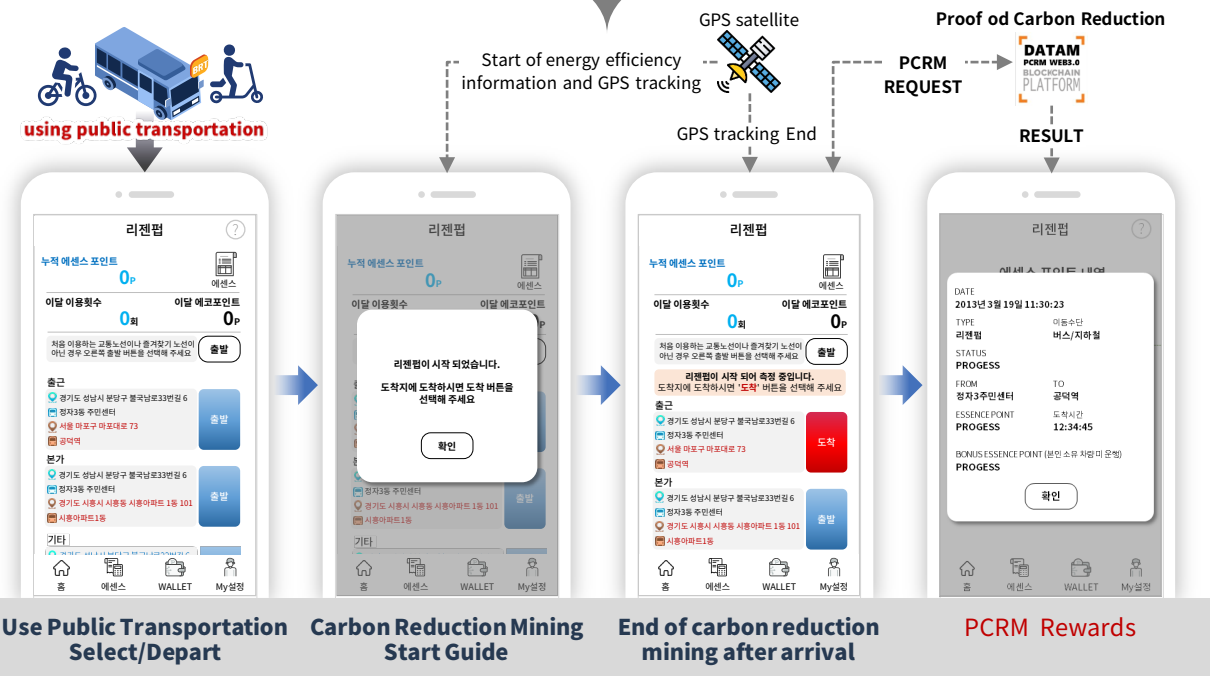
DATAM

6. PCRM Blockchain Business

REGENPUB

REGENPUB provides a reward system for carbon emission reduction using cryptocurrency, as well as a big data collection and analysis system based on vehicle and road condition monitoring. It applies patented technology in energy efficiency and climate behavior collection and analysis. Users are rewarded based on carbon reduction proofs through the PCRM XTE WEB3.0 BLOCKCHAIN PLATFORM, which is integrated into an ONCHAIN system.





Vietnam BRT Transit Transition Project

- Project Lead : DATAM
- Project Application Institution : Ho Chi Minh City
- Project Final Approval Institution : Prime Minister's Office of Vietnam
- Project Consulting Institution : UNDP x DATAM Joint Consulting
- Pilot Project Scale : Approximately 100 BRT E-Buses, 1 Bus Route, $10,000,000
- Total Project Scale : Approximately 10,000 BRT E-Buses, 100 Bus Routes, $600,000,000
- Project Funding : GCF (Green Climate Fund), Green Fund, ODA Funding
- Project Progress

2018. 10	~	2019. 05	Conducting a local transportation survey in Ho Chi Minh City to assess the current transportation situation and develop a project implementation plan.
	~	2019. 06	Organizing a business briefing and signing a Memorandum of Understanding (MoU) for project implementation on June 7, 2019. Participants include the Ministry of Science and Technology, Ministry of Natural Resources and Environment, and Ho Chi Minh City Department of Transportation and Public Works, Public Transportation Management Center.
2019. 06	~	2019. 07	Request for joint collaboration in the UNDP Private Sector Climate Change Team's e-Mobility Project, focusing on climate change mitigation, air quality improvement, and energy efficiency in Vietnam.
2019. 07	~	2019. 12	Discussion on TF team composition, initiation of detailed surveys for project implementation including specific schedules and route selection, and other discussions on electric bus specifications (requesting cooperation from transportation operators, etc.).
2020. 01	~	2020. 07	Pre-feasibility study report preparation.
	~	2020. 10.	**Agreement on the implementation of the UNDP Ho Chi Minh City Electric Bus BRT System Project with GCF (Green Climate Fund) funding.**

Laos Tuk-Tuk taxi electrification conversion project

LAO PDR(People's Democratic Republic**)**
Tuk-Tuk Electrification conversion project contract.

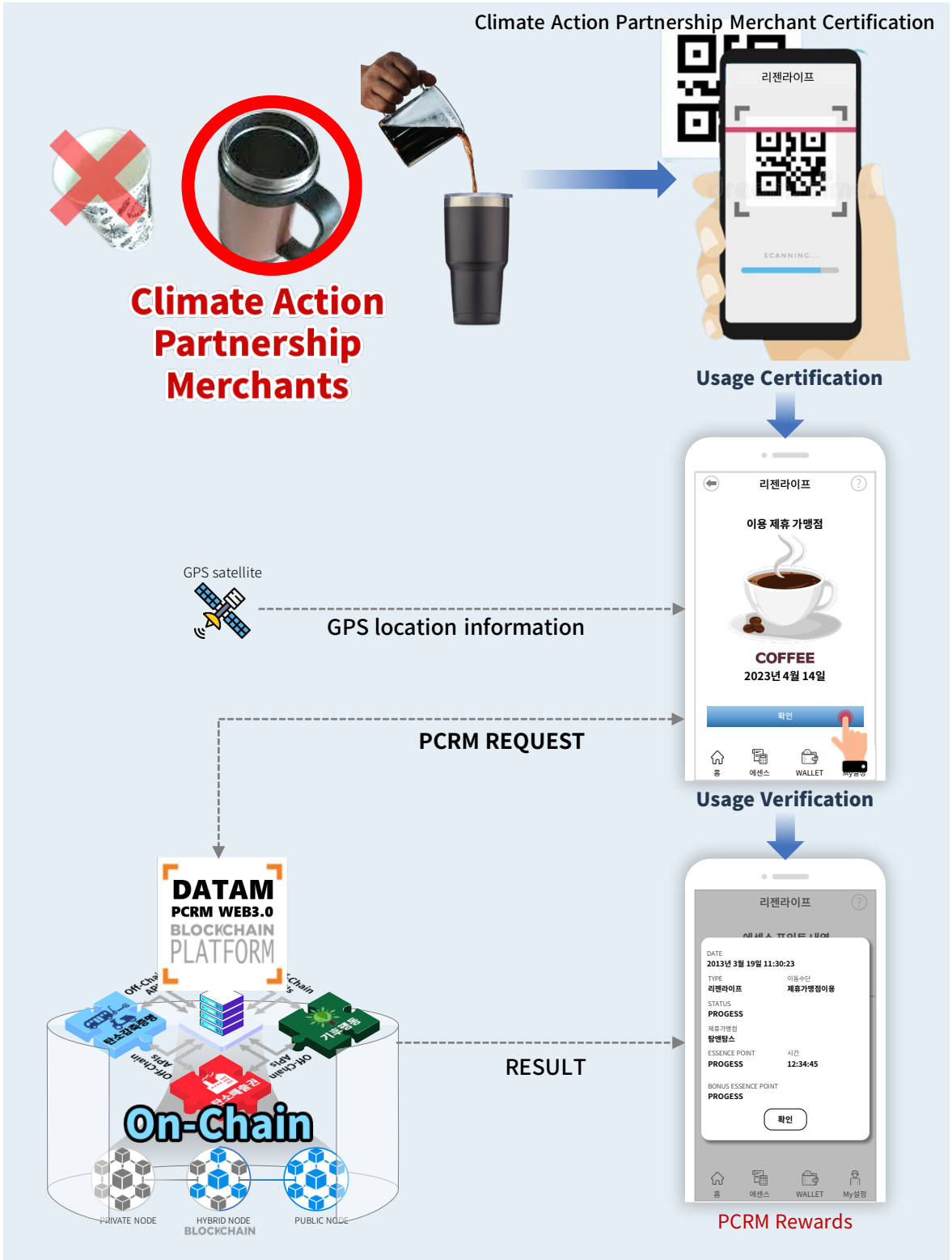

Business
DATAM helps to promote clean environment policy in Laos

- Motorcycle taxi (Tuk-Tuk) operation : Approximately 500 vehicles.
- Number of foreign tourists : Approximately 5 million people as of 2017.
- Annual tourism revenue : Approximately USD $900 million as of 2017.
- Average length of stay for tourists : Approximately 8.5 days.
- Tuk-Tuk daily mileage : Approximately 200 km/day.
- Tuk-Tuk fare per ride : 50,000 to 100,000 Kip ($7 to $14).
- Project progress status.

2018. 04	~	**2018. 12**	Public hearing and meetings
		2019. 01	Business contract with LAO PDR (January 23, 2019)
		2019. 02	Formation of TF team
		2021. 09	International Electric Vehicle Expo / DATAM E-Taxi Prototype Demonstration
2020. 01	~	**2022. 10**	**After the sample vehicles are transported to LAO PDR, the approval process will be carried out.**

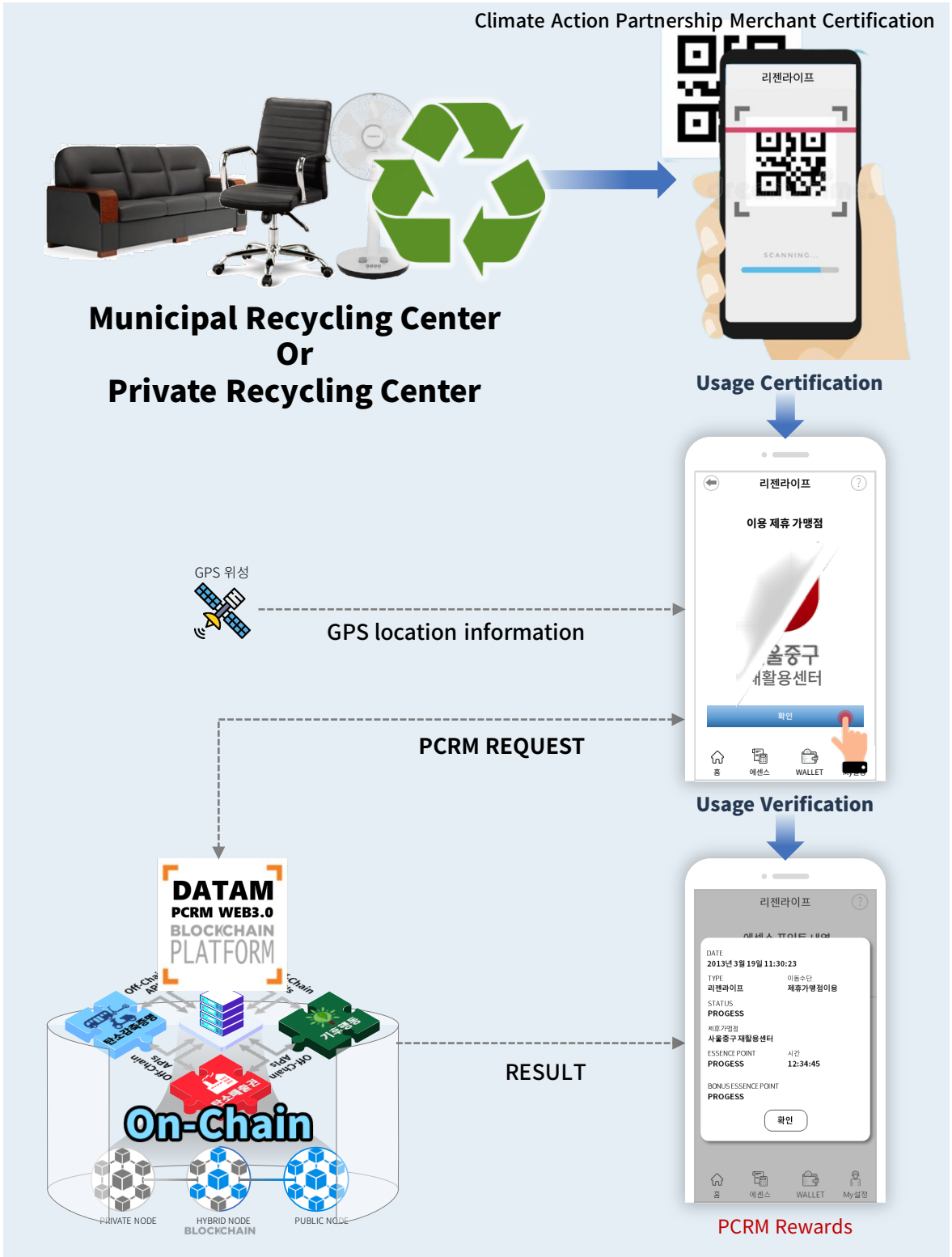
One-time Consumption Reduction Climate Action Project.

The REGENLIFE project aims to promote climate-friendly behavior in everyday life and targets carbon reduction in various activities. Through this initiative, the project aims to establish a foundation for private sector-driven carbon reduction efforts, and users are provided with benefits according to a reward system based on their carbon reduction achievements.



Recycled Product Usage Climate Action Project.

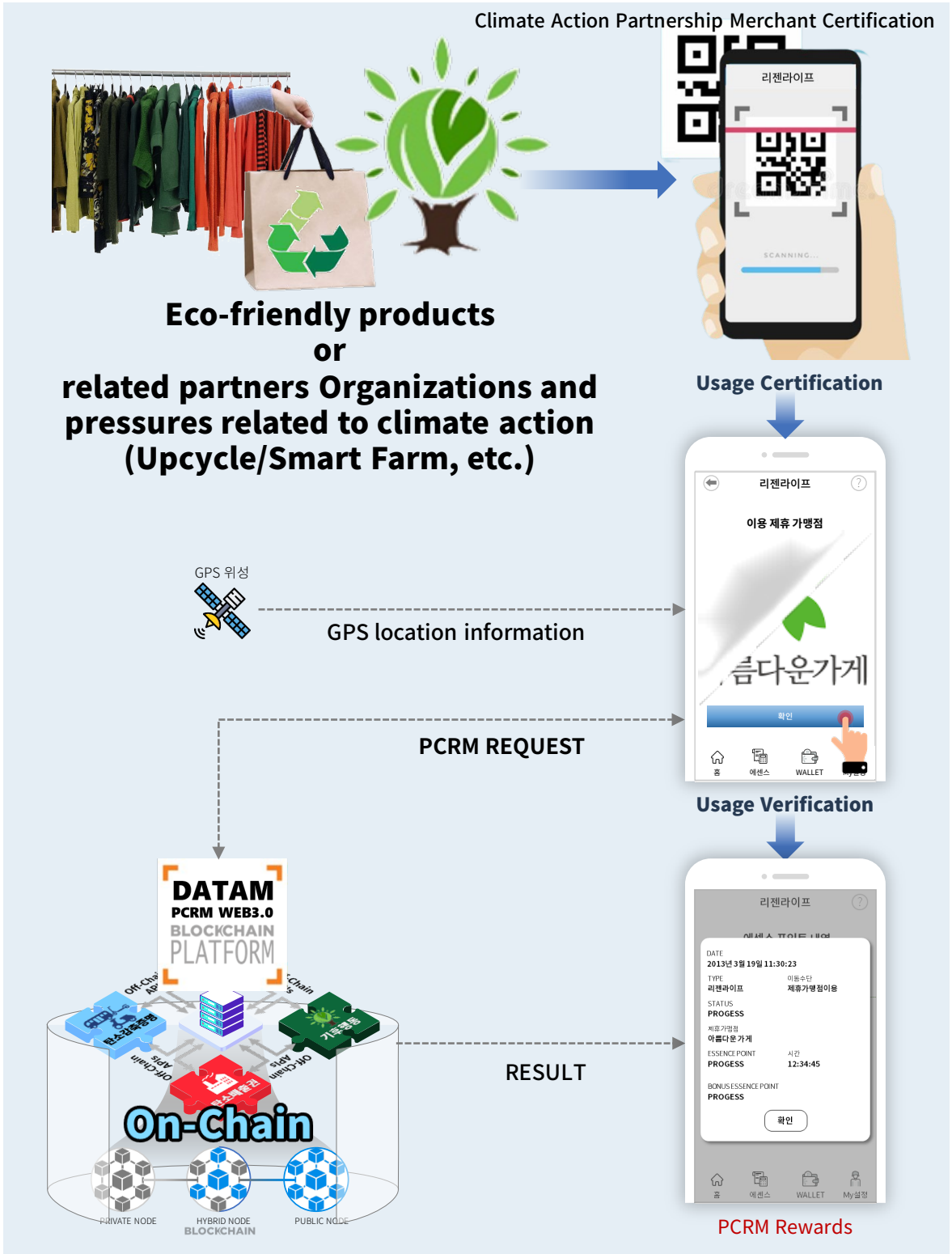
Providing compensation for greenhouse gas emission reduction through the continued use of recyclable products that align with the Sustainable Development Mechanism (SDM) system.



REGENLIFE

Carbon reduction project through the purchase of environmentally friendly products as a climate action.

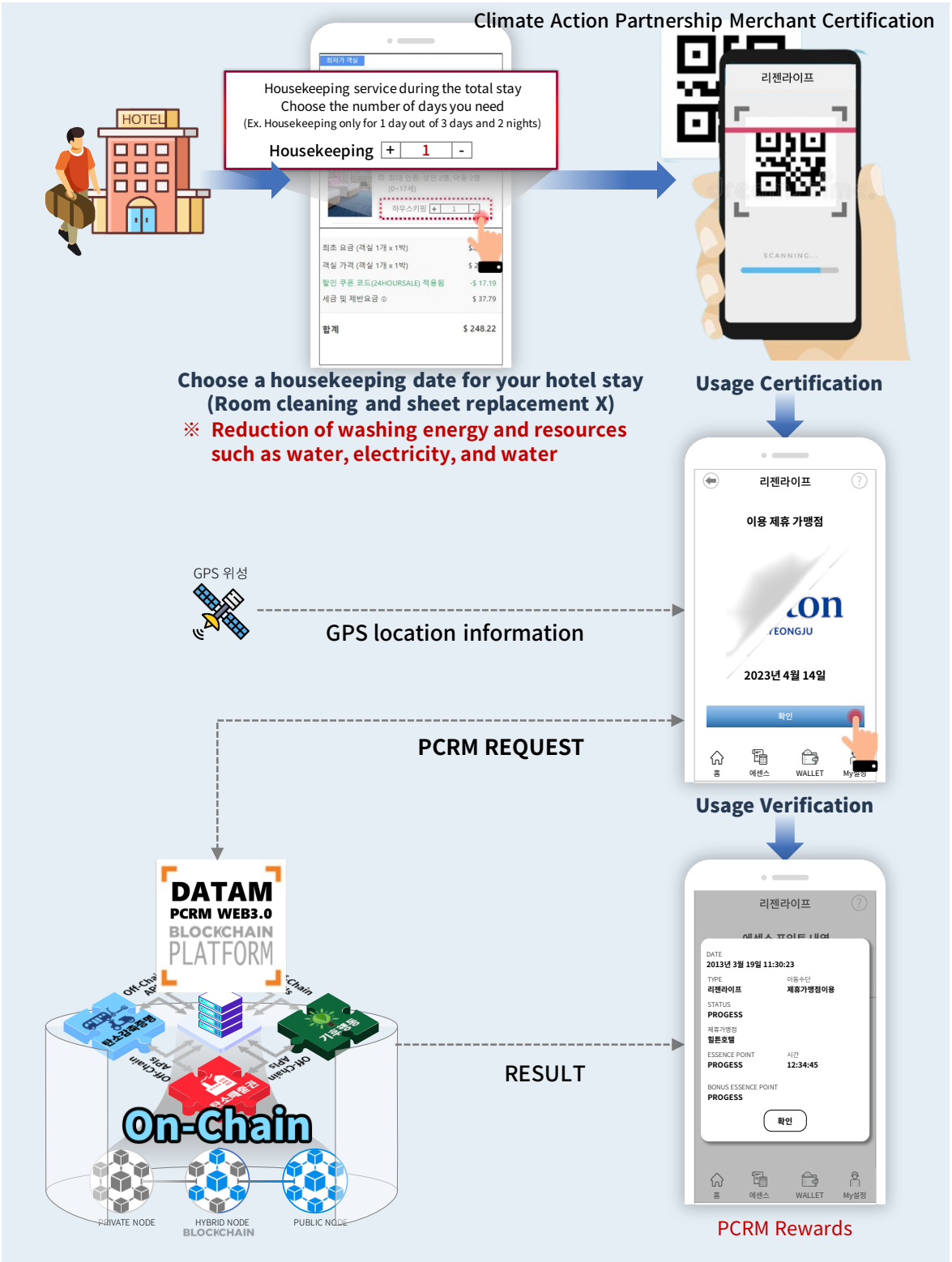
Providing incentives for expanding partnerships with eco-friendly materials or smart farming product suppliers and purchasing activities of products that apply carbon reduction methodologies.



REGENLIFE

Resource Conservation Climate Action Carbon Reduction Project

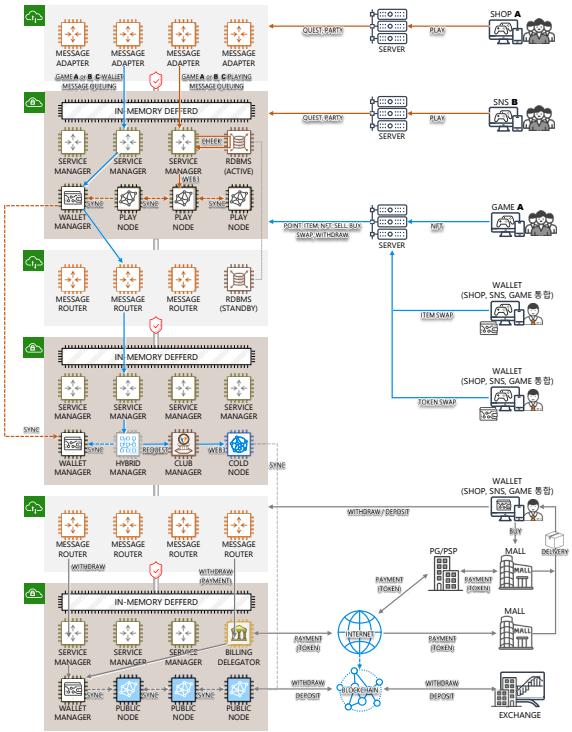
Hotels and other accommodation providers can achieve carbon reduction by excluding housekeeping (cleaning of bed sheets, etc.) for just one day, thus reducing the energy costs and greenhouse gas emissions associated with it. Compensation will be provided accordingly.

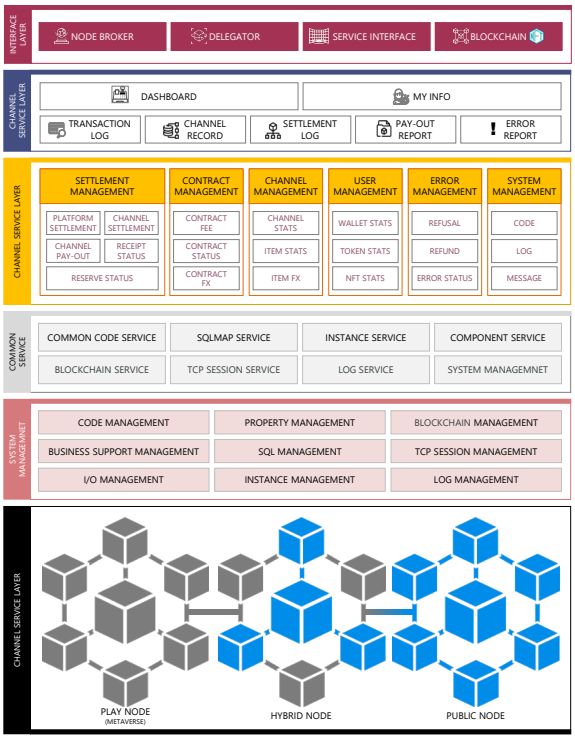


7. PCRM XTE WEB 3.0 ARCHITECTURE

7. PCRM XTE WEB 3.0 ARCHITECTURE

PCRM PLATFORM STRUCTURE





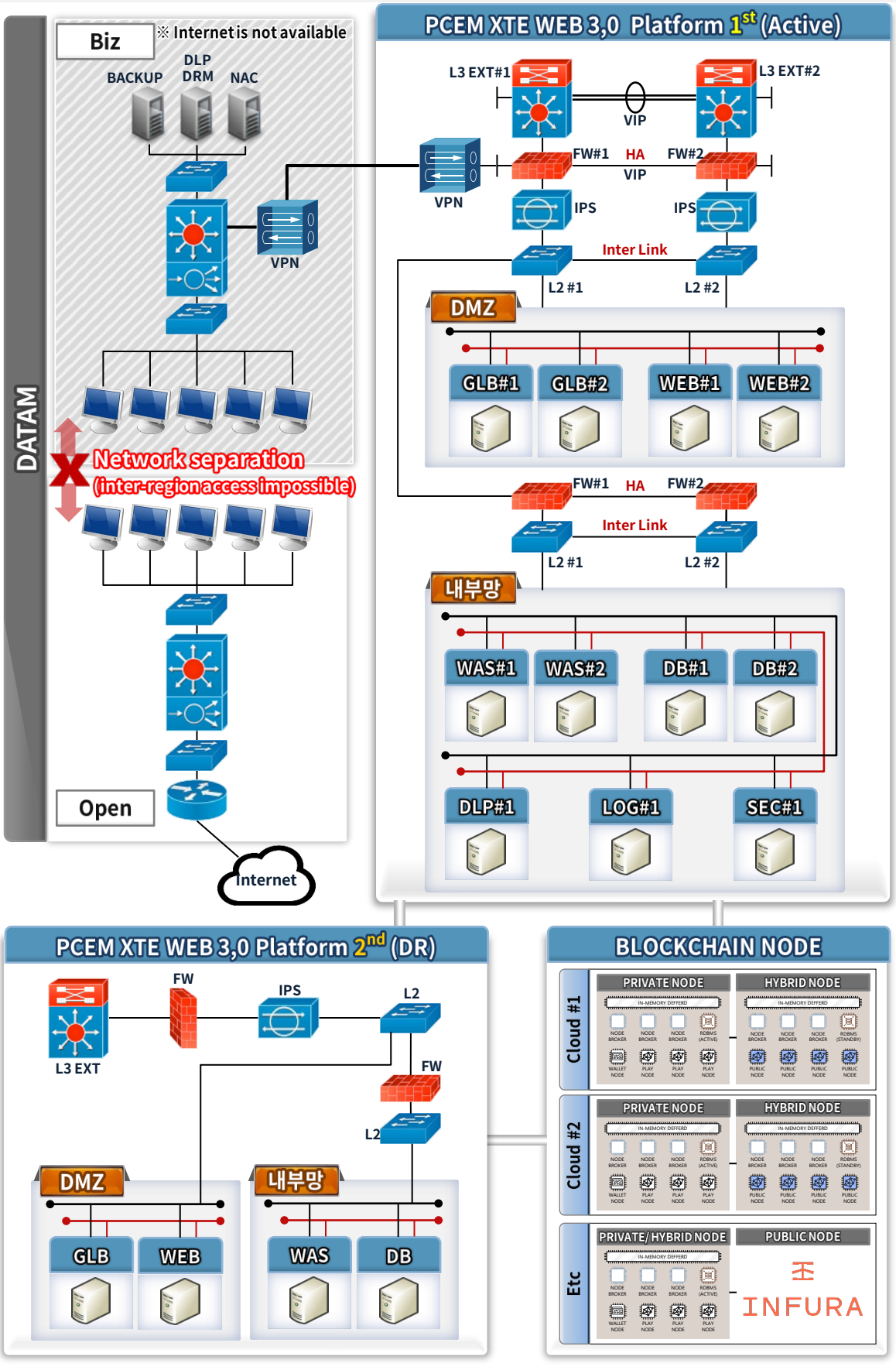
JBoss · jetty:// · redis · HTML · CSS · JS · Bootstrap · Java · Golang

We can provide a reliable and secure service with a robust architecture based on scripting languages like JAVA, Golang, etc., which allow for easy monitoring, maintenance, and support. The PCRM XTE WEB3.0 BLOCKCHAIN PLATFORM is built on open-source technology, providing flexible scalability.

ethereum · klaytn · BORA · polygon · Shardeum · CARDANO · AVALANCHE · fantom

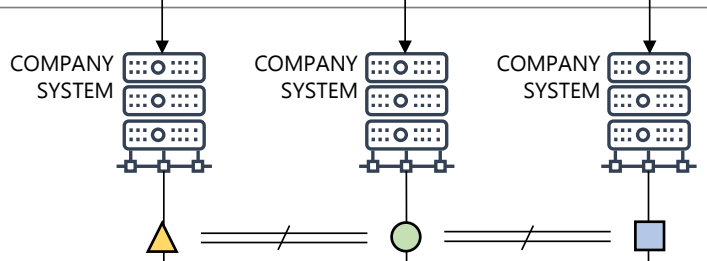
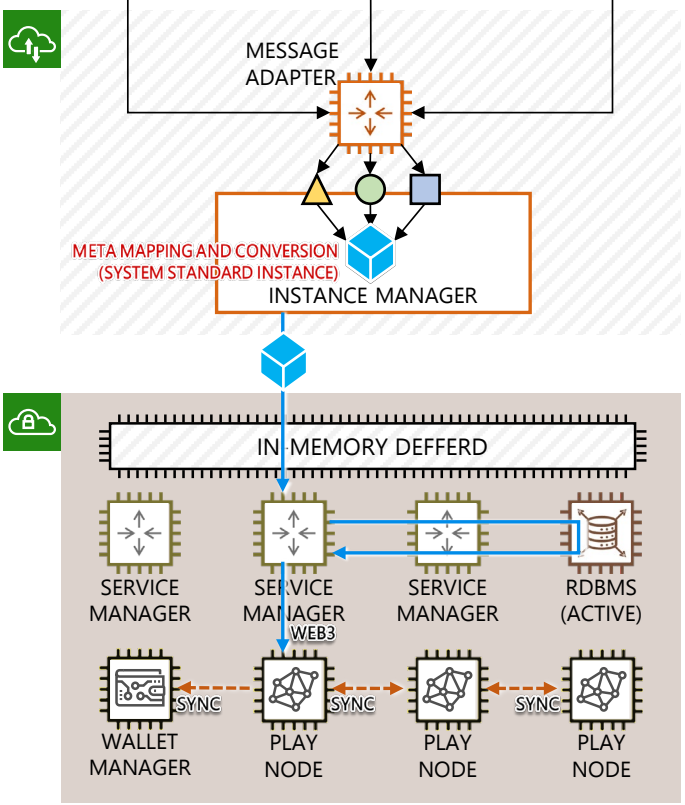
WITH EVM ERC20 Compatible

PCRM PLATFORM ARCHITECTURE



PCRM FLEXIBLE META MANAGEMENT

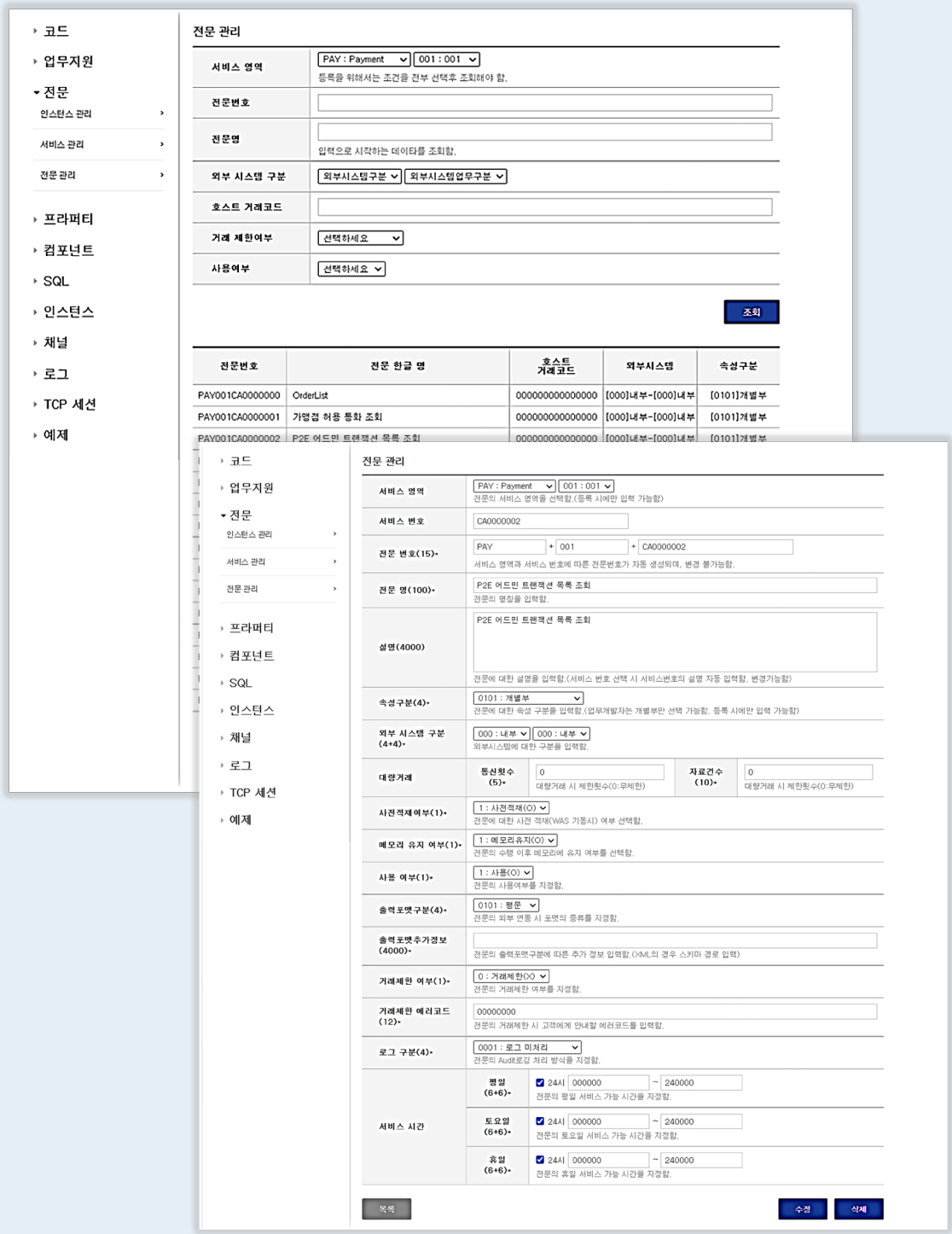
We provide various management functions to efficiently support interfaces with different specifications for each participating organization, excluding the common area, and to provide convenience in their implementation.

Correction Target	SYSTEM Process
• COMPANY UI and APIs	
• Send transaction to PCRM • Add transaction Service Add(public) Point Exchange request Balance inquiry/Callback Withdraw	
• External TX Instance Mapping • Blockchain backend processing • Transaction Settlement	

7. PCRM XTE WEB 3.0 ARCHITECTURE

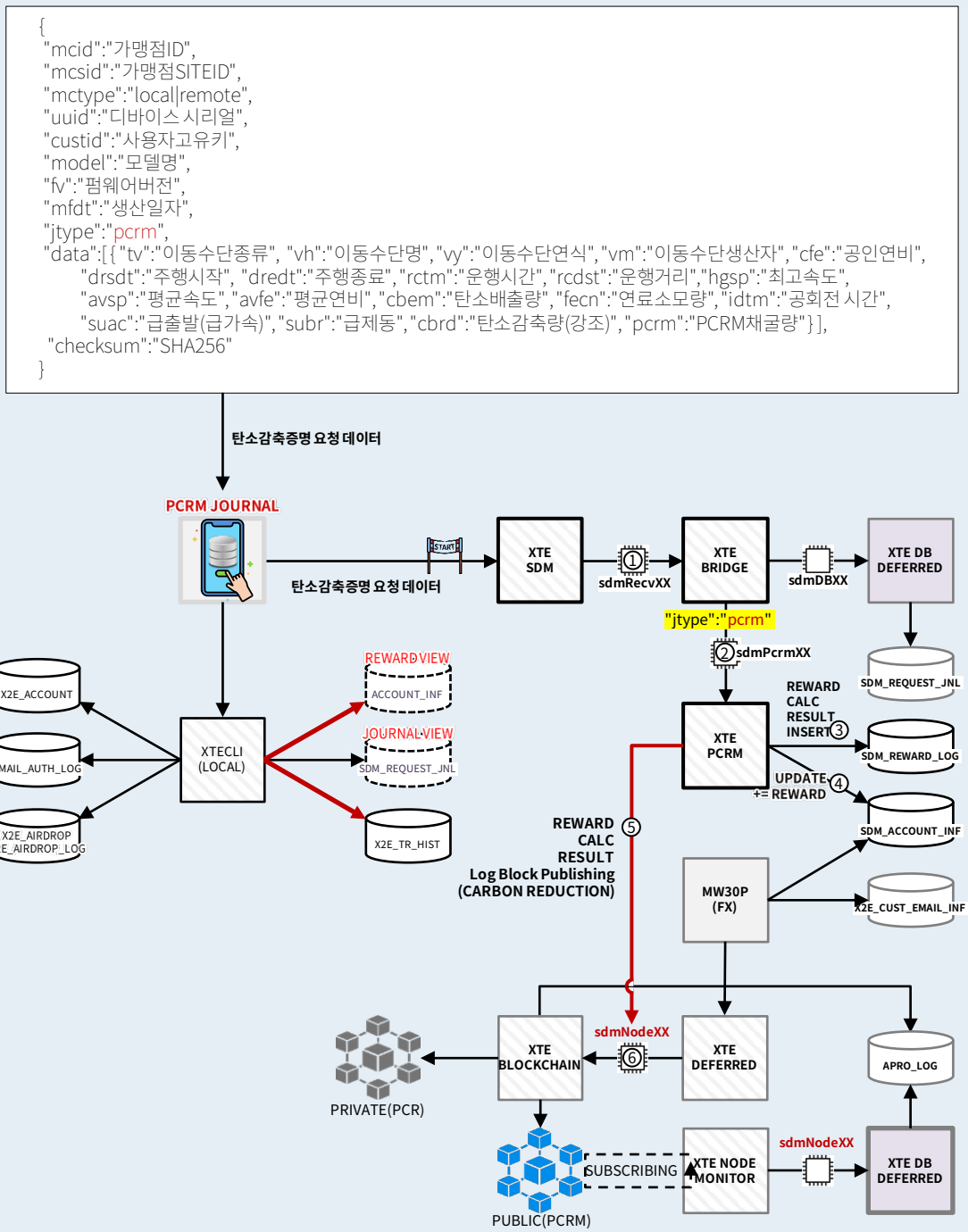
PCRM FLEXIBLE META MANAGEMENT

To enable fast and flexible service integration, we provide various functionalities, particularly supporting the mapping and conversion of interfaces and messages (data formats) with different specifications for each participating organization, minimizing the impact of changes and enabling smooth operation.



PCRM ON-CHAIN FLOW

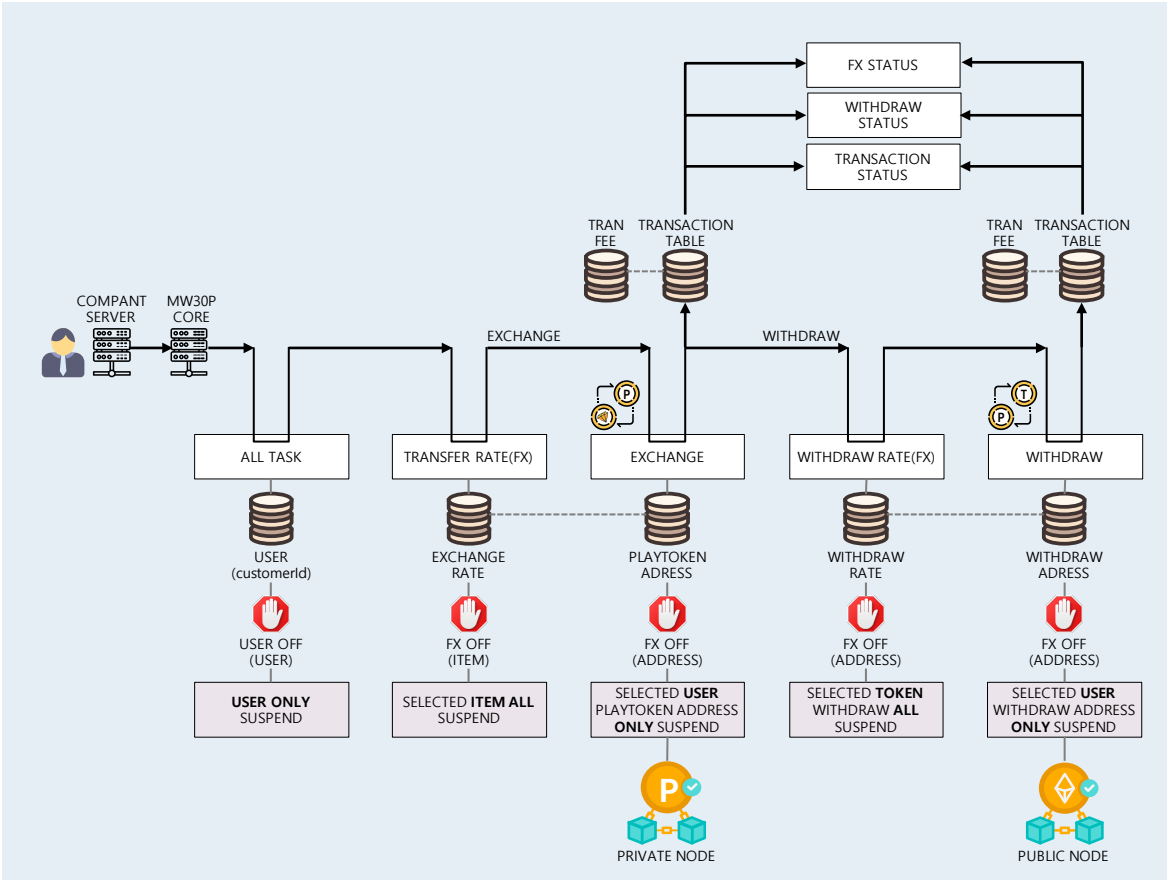
The PCRM XTE WEB3.0 BLOCKCHAIN PLATFORM supports flexible and quick integration with On-Chain for Off-Chain carbon offset verification requests that are demanded in various domains.

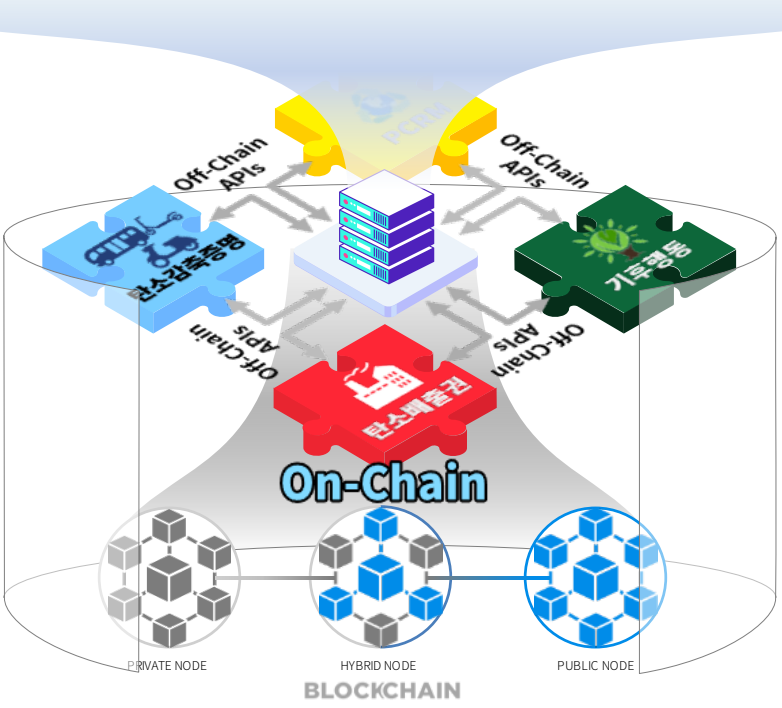


7. PCRM XTE WEB 3.0 ARCHITECTURE

PCRM ADMINISTRATOR

The PCRM XTE WEB3.0 BLOCKCHAIN PLATFORM supports various management tasks such as configuration, inquiry, monitoring, and statistics for requests.





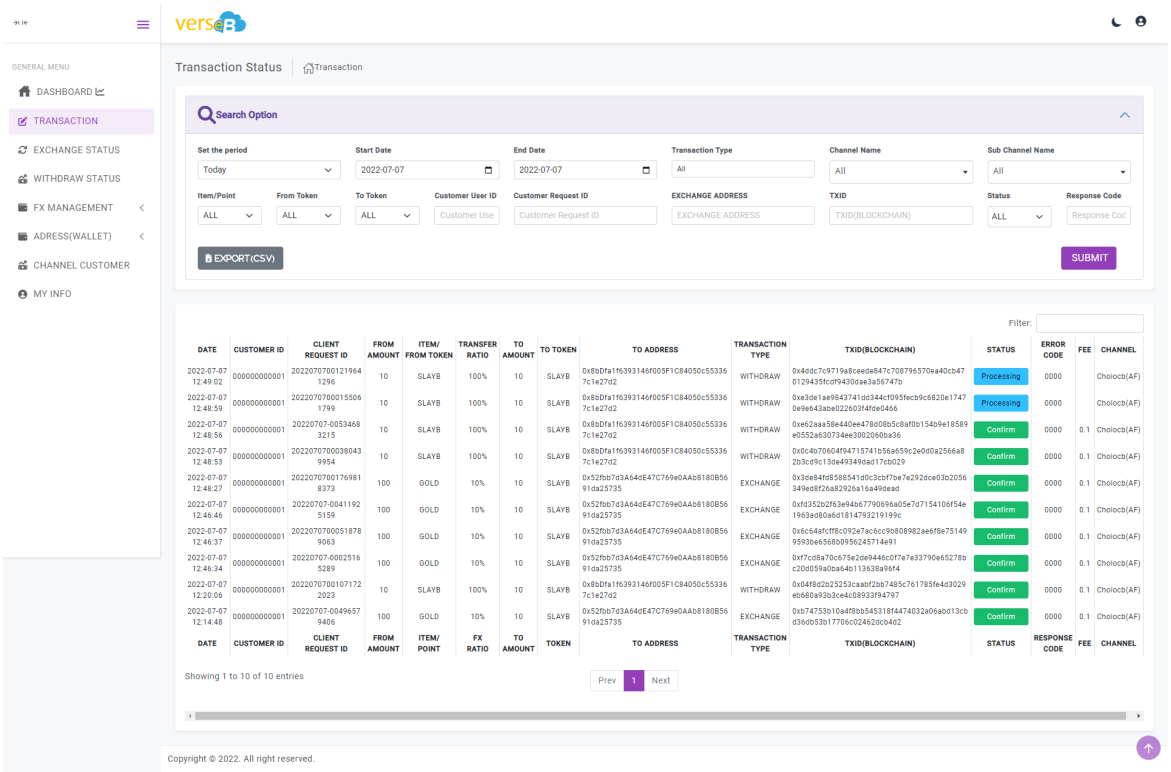
PCRM ADMINISTRATOR MENU

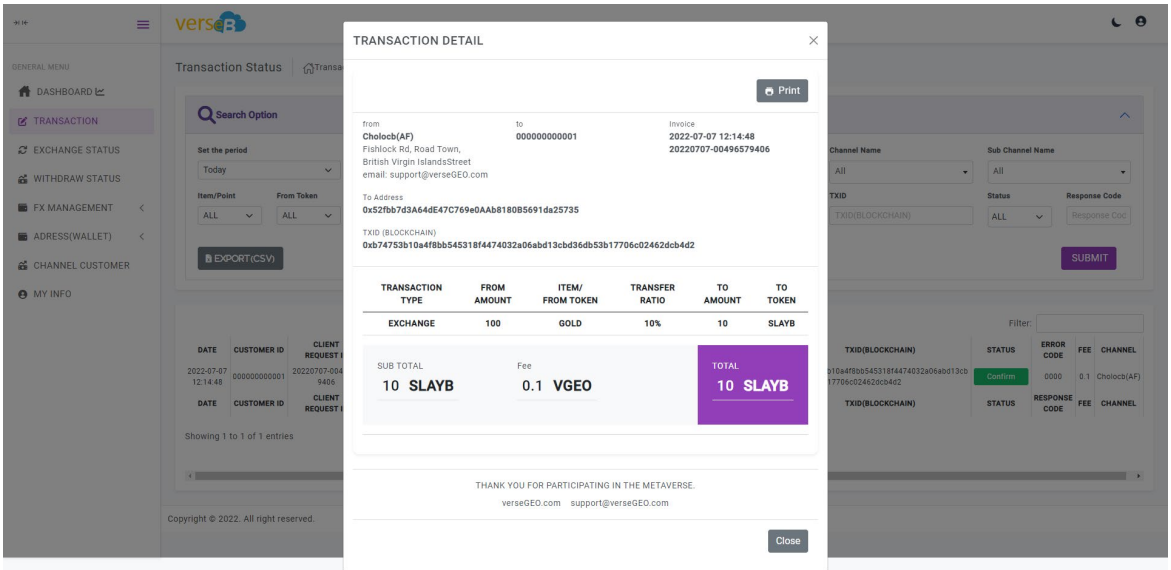
MENU	OWNERSHIP
GENERAL	
DASHBOARD	
TRANSACTION	Public use (accessible for logged-in users only)
EXCHANGE STATUS	Public use (accessible for logged-in users only)
WITHDRAW STATUS	Public use (accessible for logged-in users only)
FX MANAGEMENT	
EXCHANGE FX	Public use (accessible for logged-in users only)
WITHDRAW FX	Public use (accessible for logged-in users only)
ADRESS(WALLET)	
EXCHANGE ADDRESS	Public use (accessible for logged-in users only)
WITHDRAW ADDRESS	Public use (accessible for logged-in users only)
CHANNEL CUSTOMER	Public use (accessible for logged-in users only)
MY INFO	Public use (accessible for logged-in users only)
SUPERVISOR	
TXN MANAGEMENT	
TRANSACTION	Public use (accessible for all channels)
EXCHANGE	Public use (accessible for all channels)
WITHDRAW	Public use (accessible for all channels)
EXCHANGE(DAILY)	Exclusive for SUPERVISOR
WITHDRAW(DAILY)	Exclusive for SUPERVISOR
TRANSFERENCE	
EXCHANGE FX	Public use (accessible for all channels)
WITHDRAW FX	Public use (accessible for all channels)
WALLET	
EXCHANGE ADDRESS	Public use (accessible for all channels)
WITHDRAW ADDRESS	Public use (accessible for all channels)
CHANNEL	
CHANNEL INFO	Exclusive for SUPERVISOR
CHANNEL USER	Exclusive for SUPERVISOR
SYSTEM	
BUSINESS DATE	Exclusive for SUPERVISOR
WALLET NODE	Exclusive for SUPERVISOR
CODE INFO	Exclusive for SUPERVISOR
ERROR MESSAGE	Exclusive for SUPERVISOR

7. PCRM XTE WEB 3.0 ARCHITECTURE

PCRM ADMINISTRATOR FUNCTION

TRANSACTION STATUS

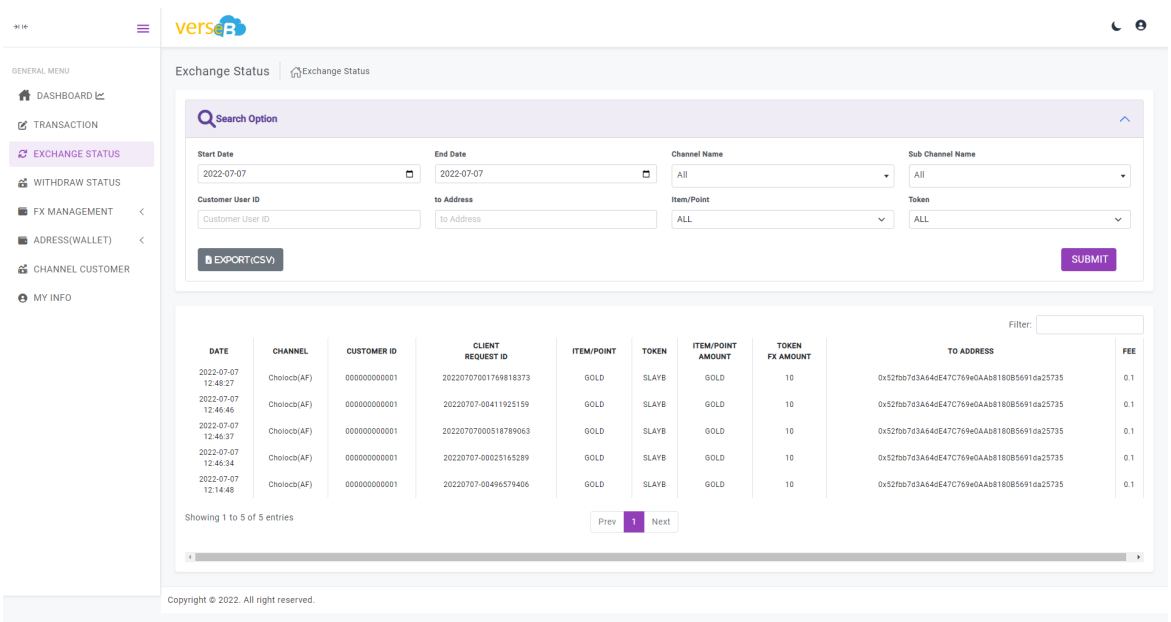




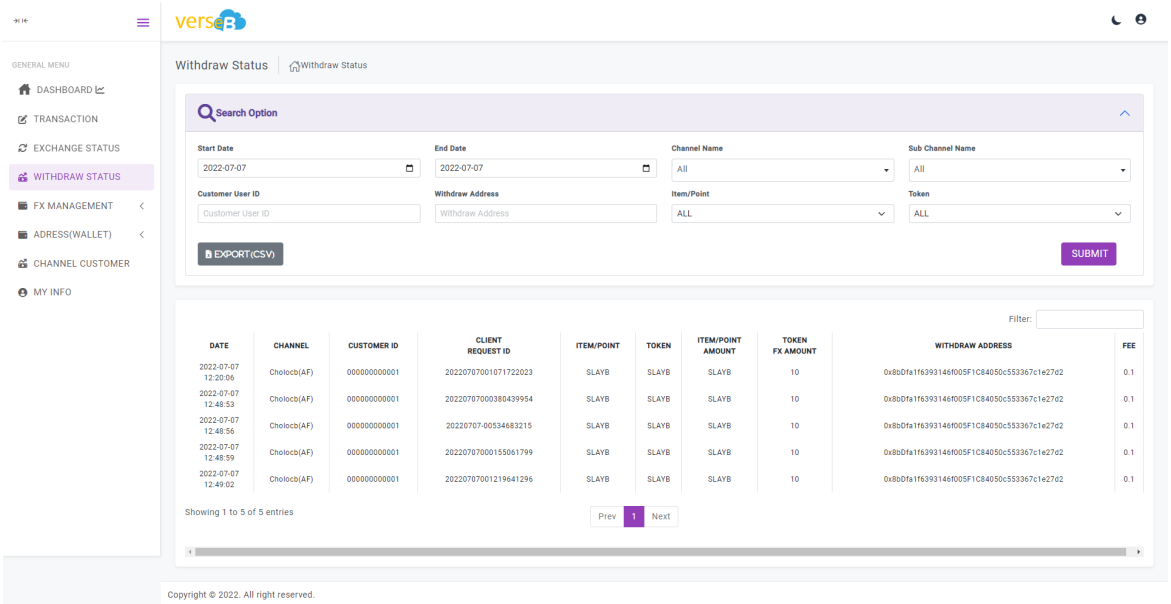
7. PCRM XTE WEB 3.0 ARCHITECTURE

PCRM ADMINISTRATOR FUNCTION

EXCHANGE STATUS



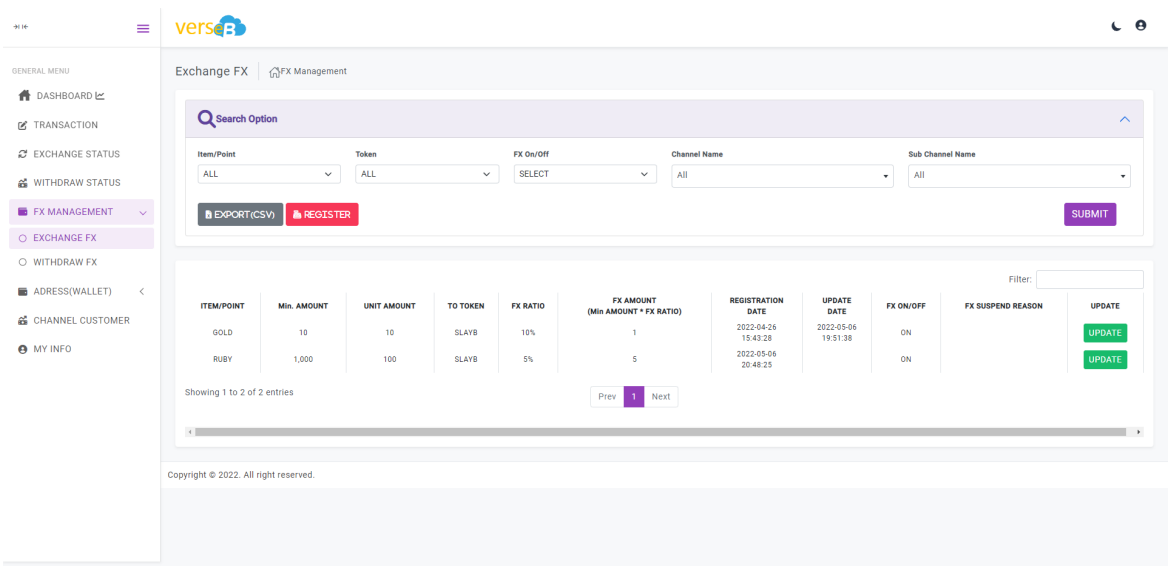
WITHDRAW STATUS

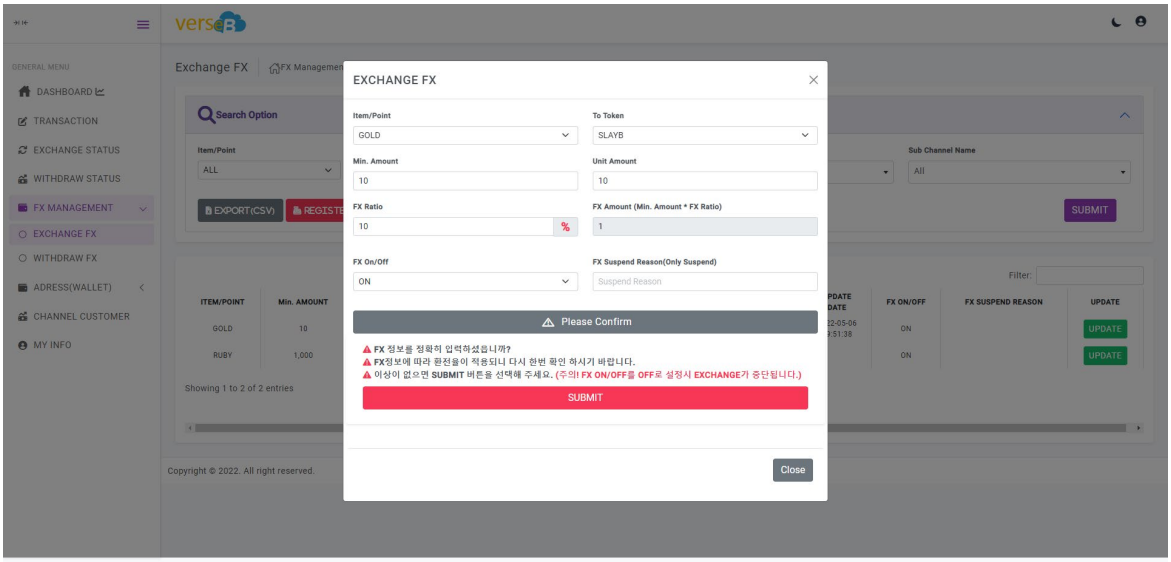


7. PCRM XTE WEB 3.0 ARCHITECTURE

PCRM ADMINISTRATOR FUNCTION

EXCHANGE FX

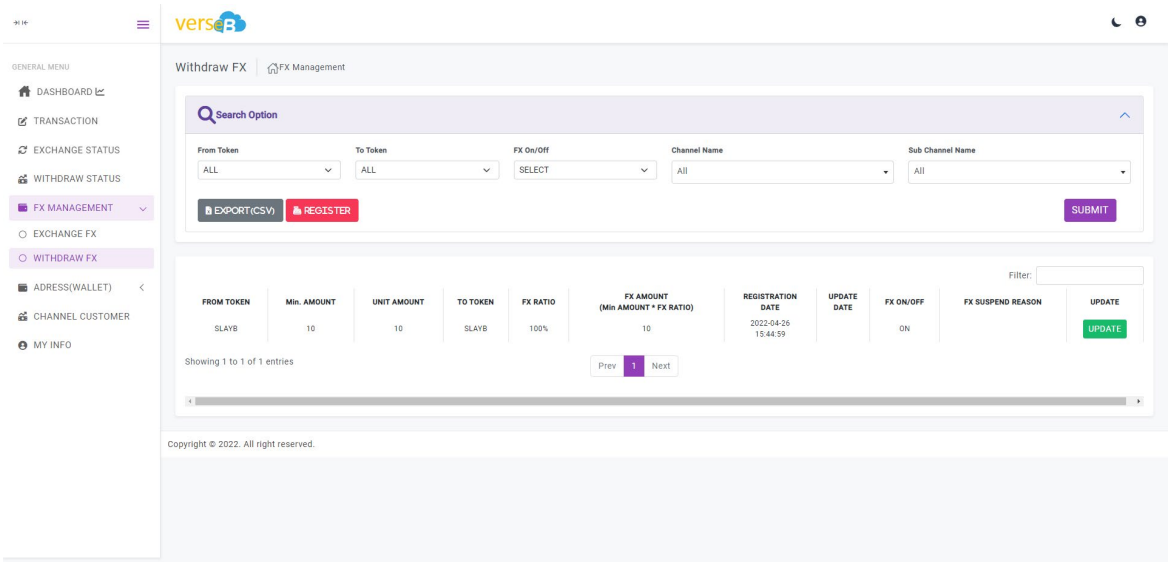


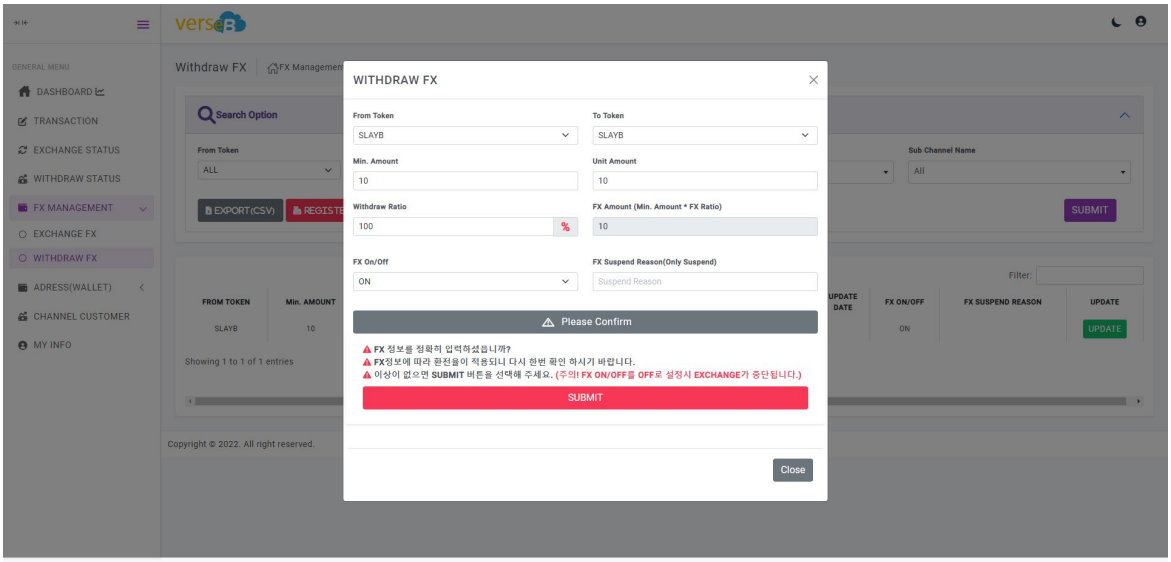


7. PCRM XTE WEB 3.0 ARCHITECTURE

PCRM ADMINISTRATOR FUNCTION

WITHDRAW FX

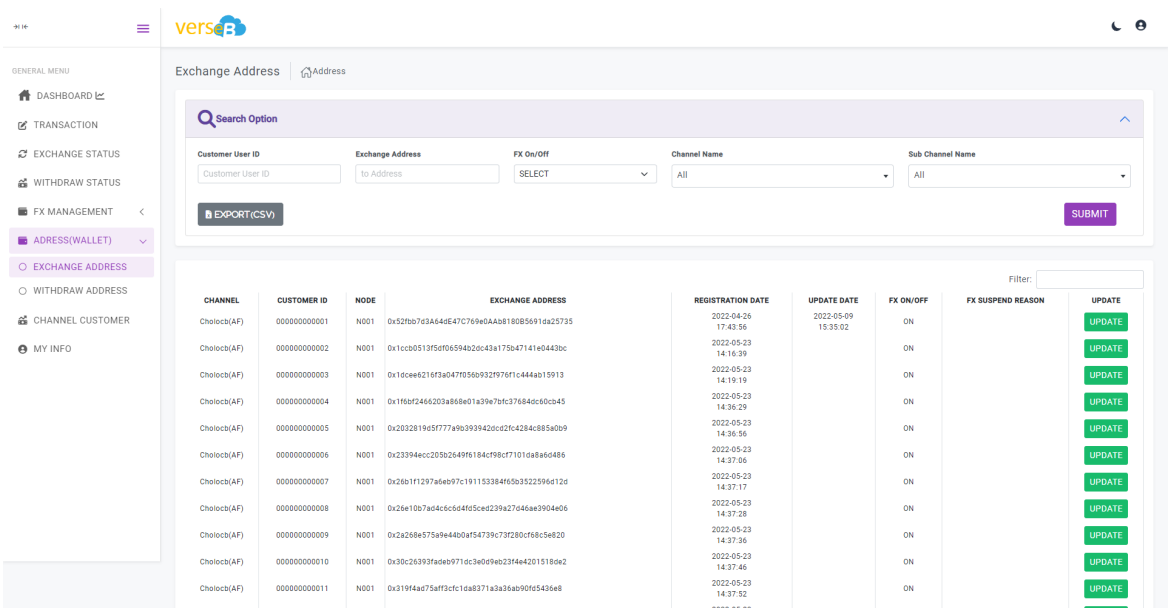


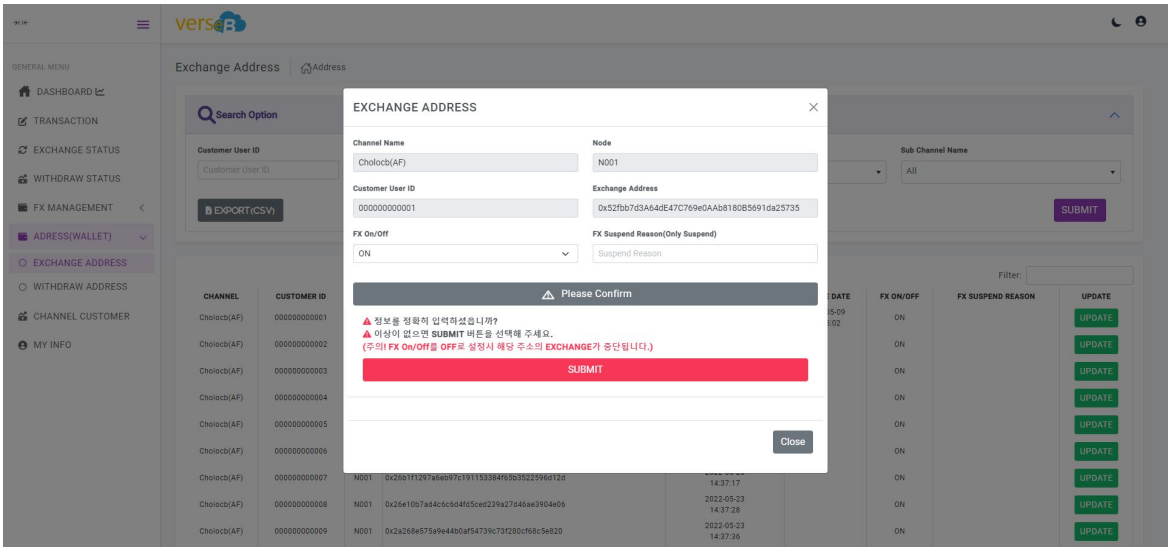


7. PCRM XTE WEB 3.0 ARCHITECTURE

PCRM ADMINISTRATOR FUNCTION

EXCHANGE ADDRESS

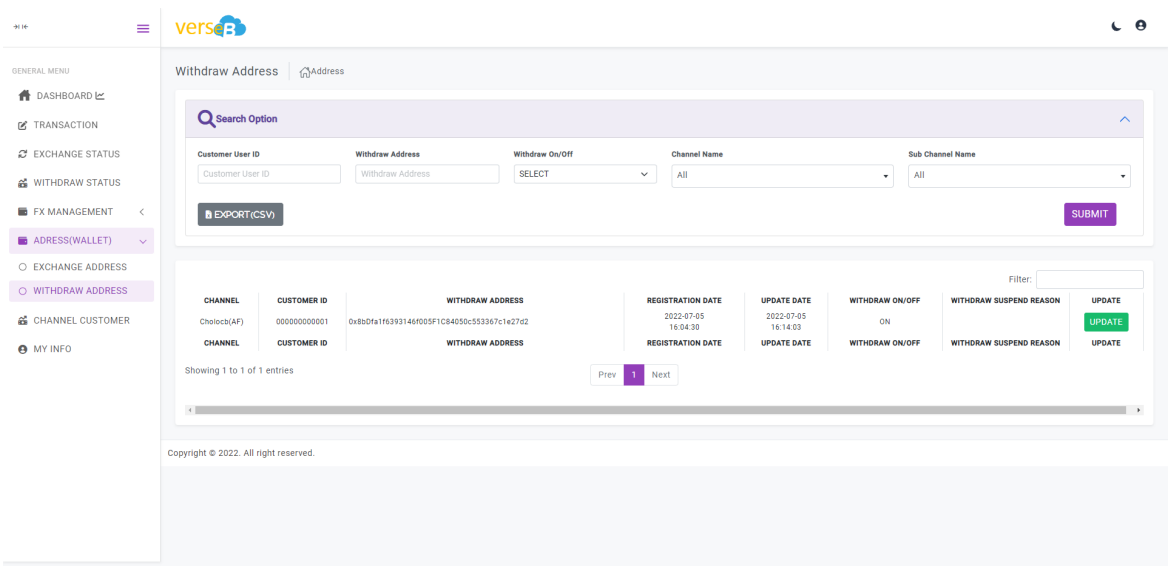


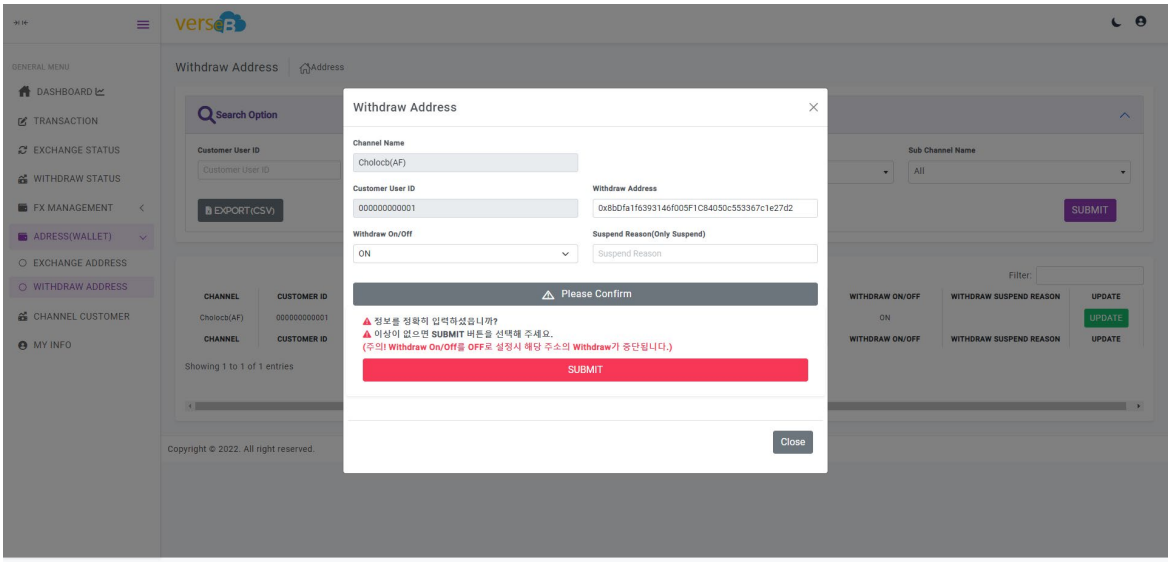


7. PCRM XTE WEB 3.0 ARCHITECTURE

PCRM ADMINISTRATOR FUNCTION

WITHDRAW ADDRESS

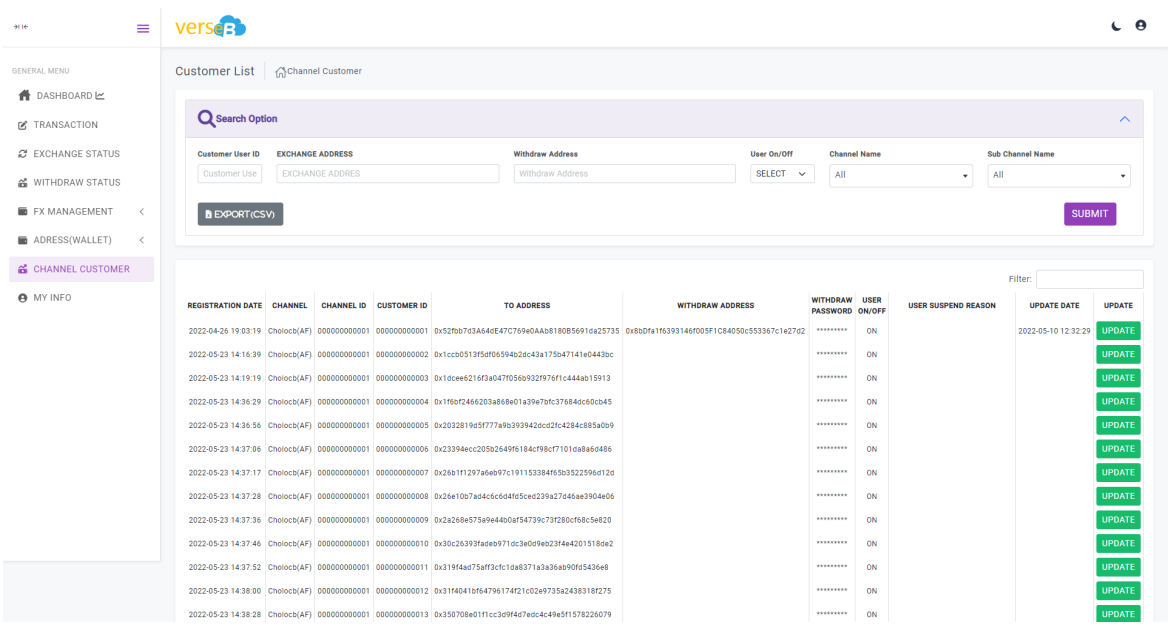


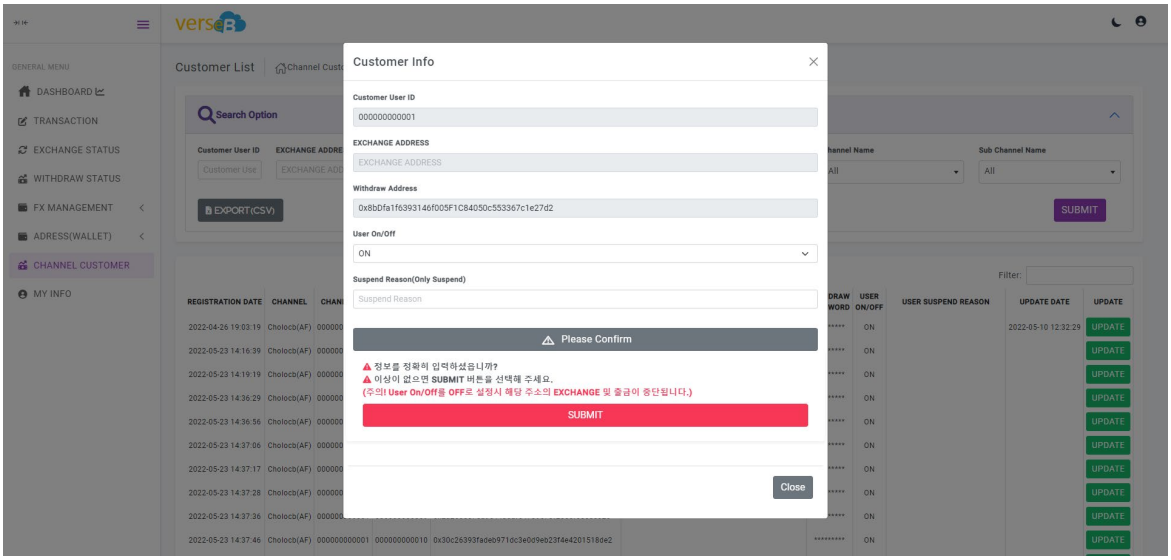


7. PCRM XTE WEB 3.0 ARCHITECTURE

PCRM ADMINISTRATOR FUNCTION

CUSTOMER LIST

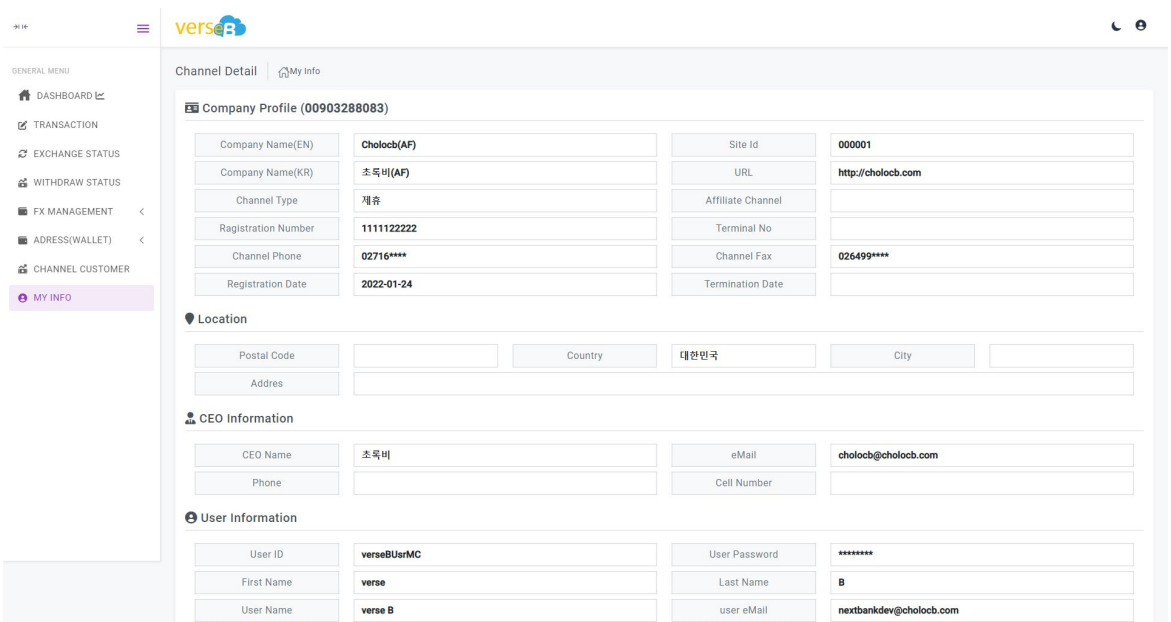


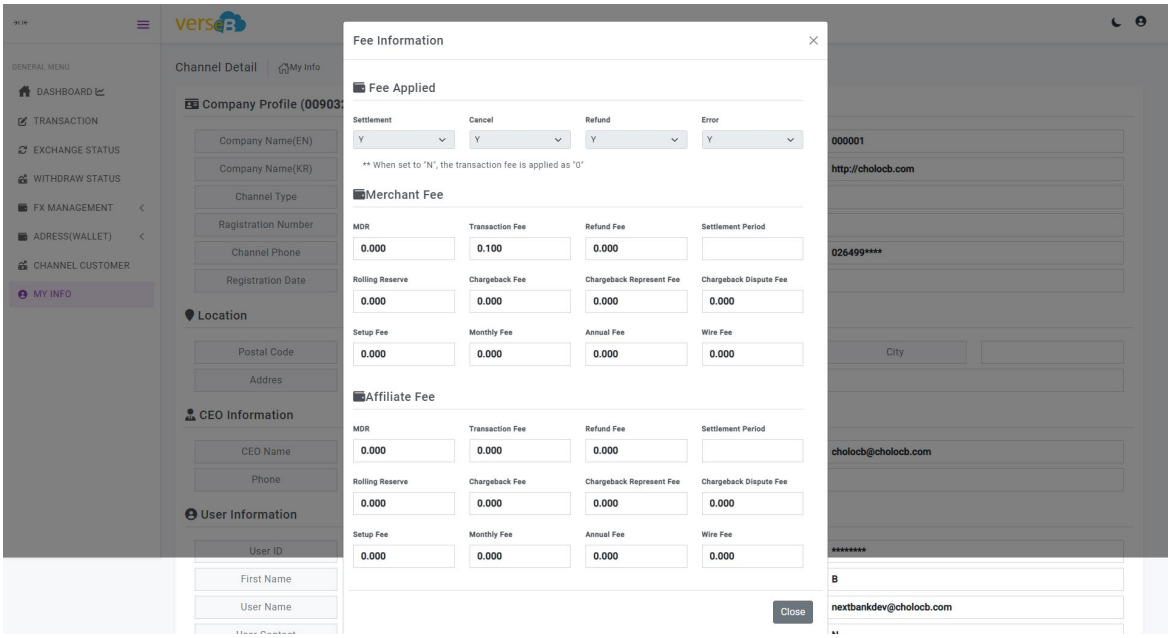


7. PCRM XTE WEB 3.0 ARCHITECTURE

PCRM ADMINISTRATOR FUNCTION

CHANNEL DETAIL(MyInfo)

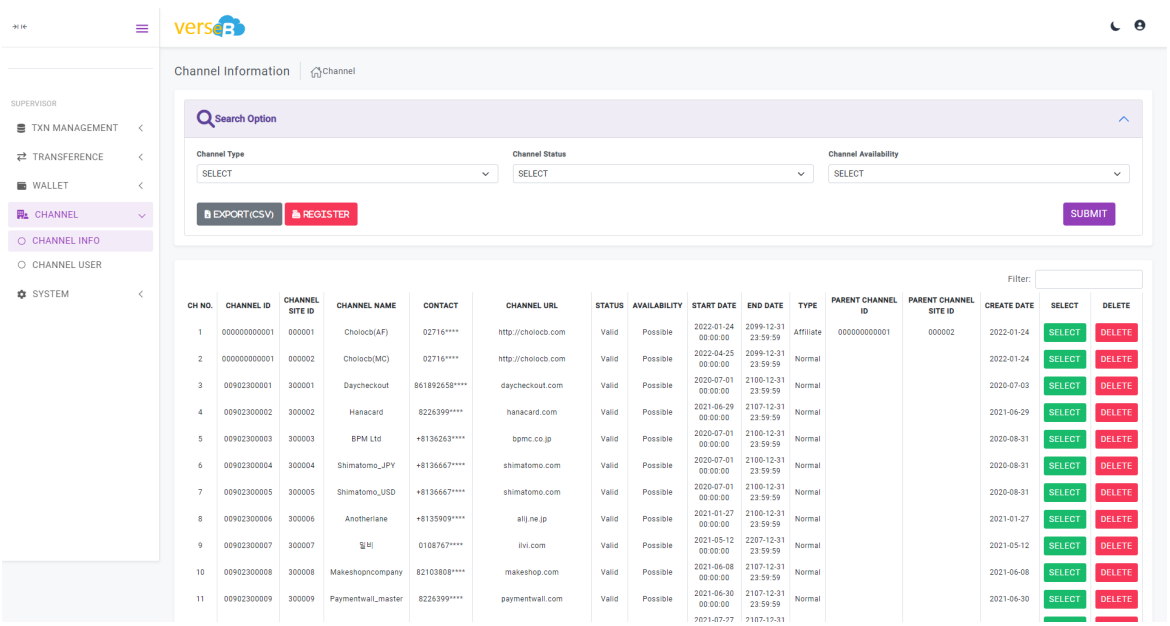


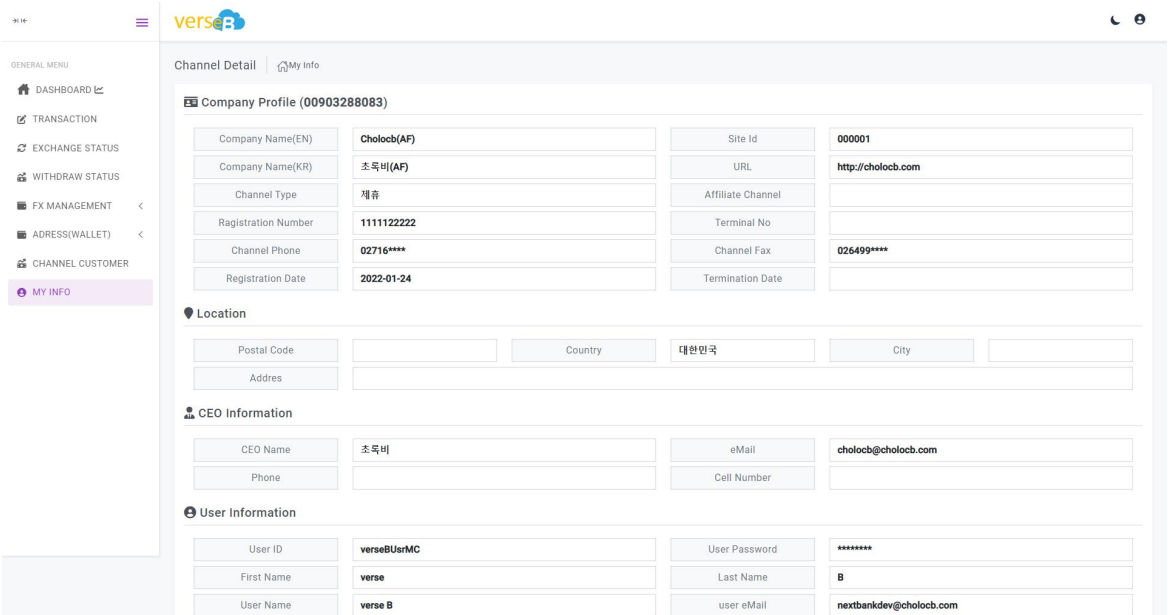


7. PCRM XTE WEB 3.0 ARCHITECTURE

PCRM ADMINISTRATOR FUNCTION

CHANNEL INFORMATION

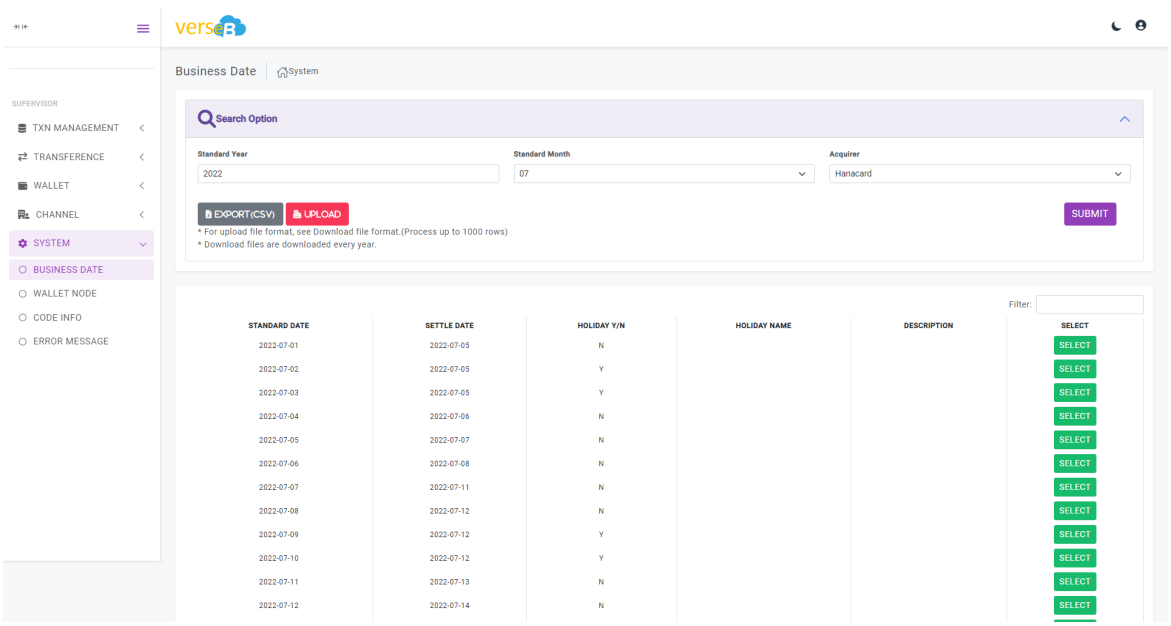


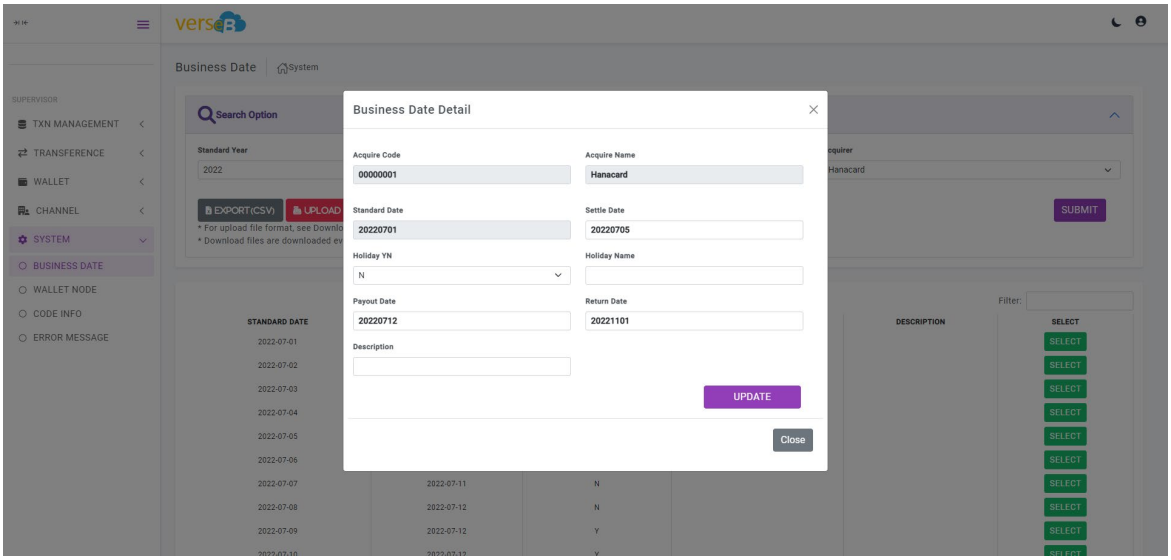


7. PCRM XTE WEB 3.0 ARCHITECTURE

PCRM ADMINISTRATOR FUNCTION

BUSINESS DATE

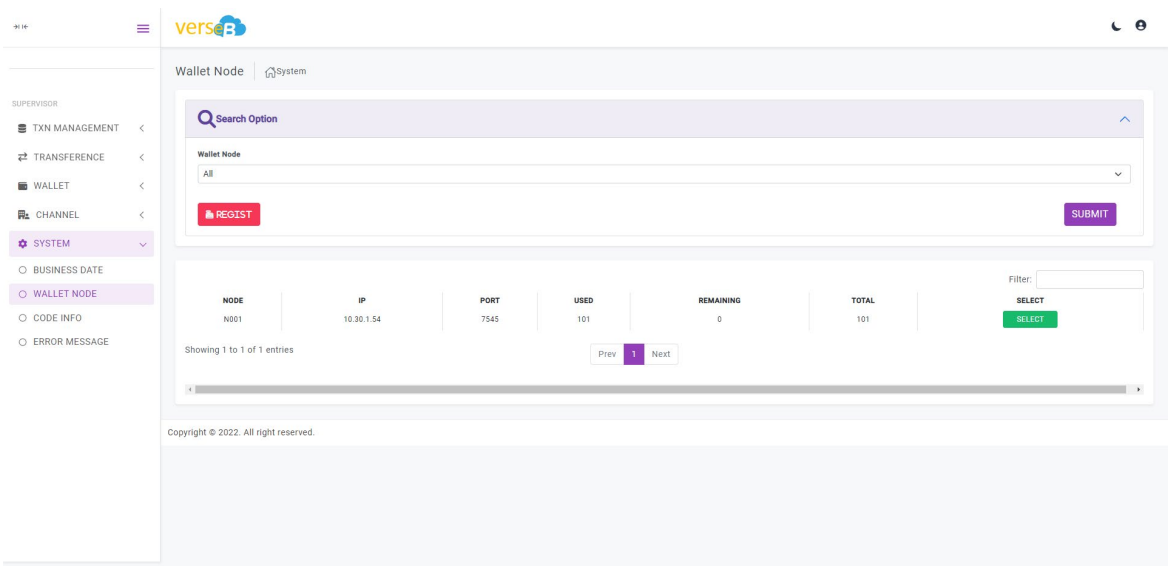


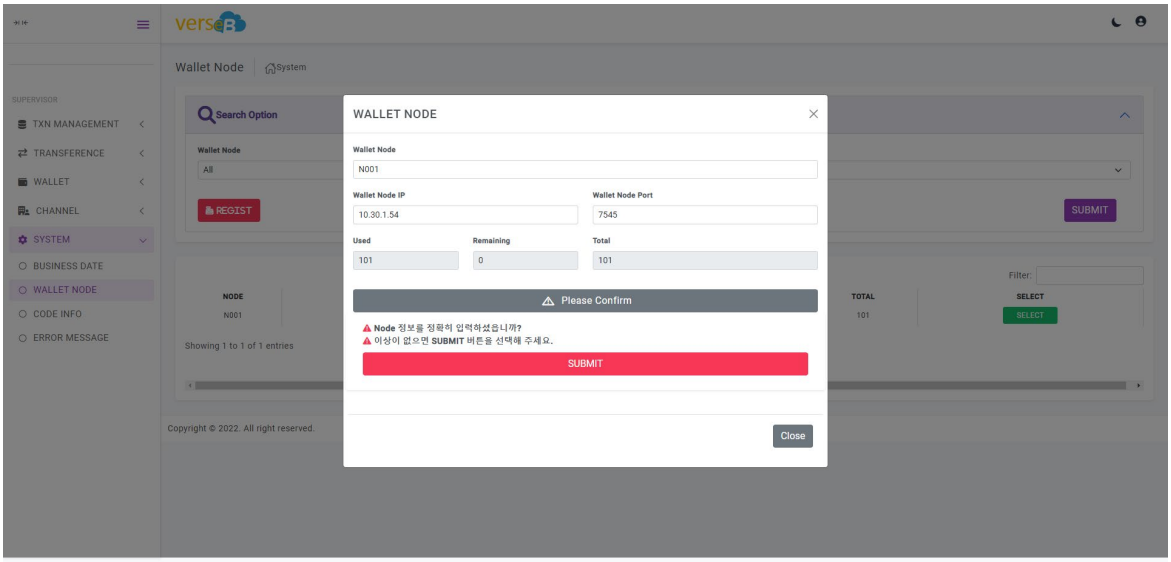


7. PCRM XTE WEB 3.0 ARCHITECTURE

PCRM ADMINISTRATOR FUNCTION

WALLET(EVM) NODE

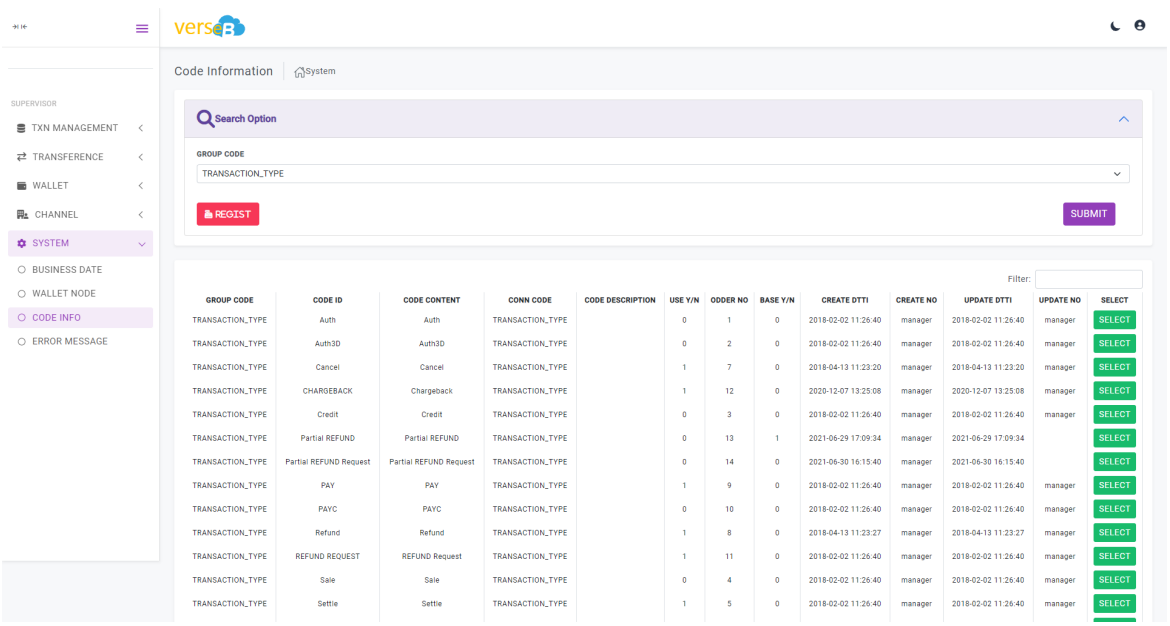


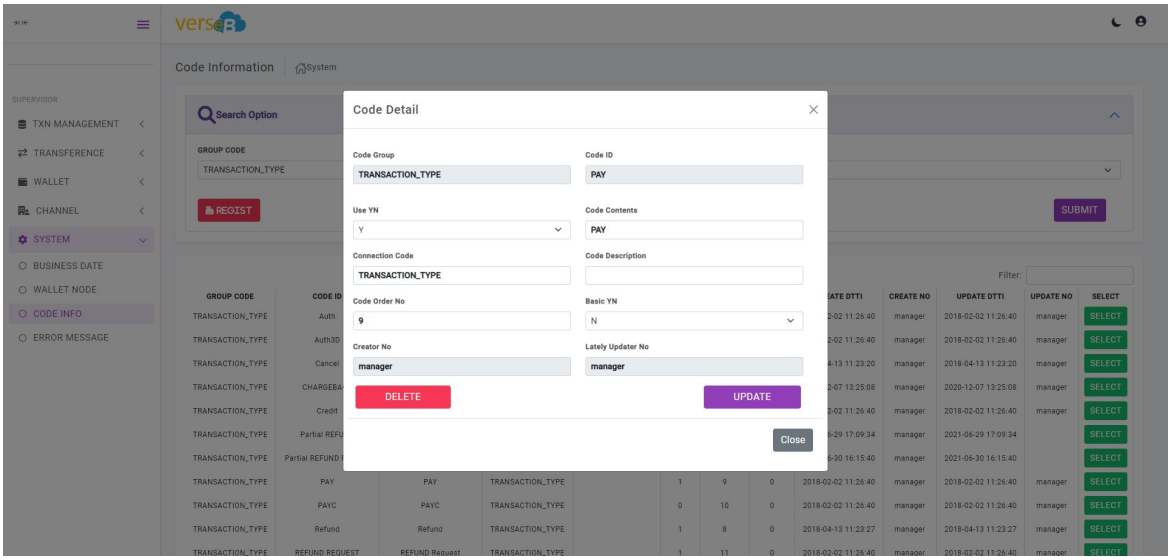


7. PCRM XTE WEB 3.0 ARCHITECTURE

PCRM ADMINISTRATOR FUNCTION

CODE INFORMATION

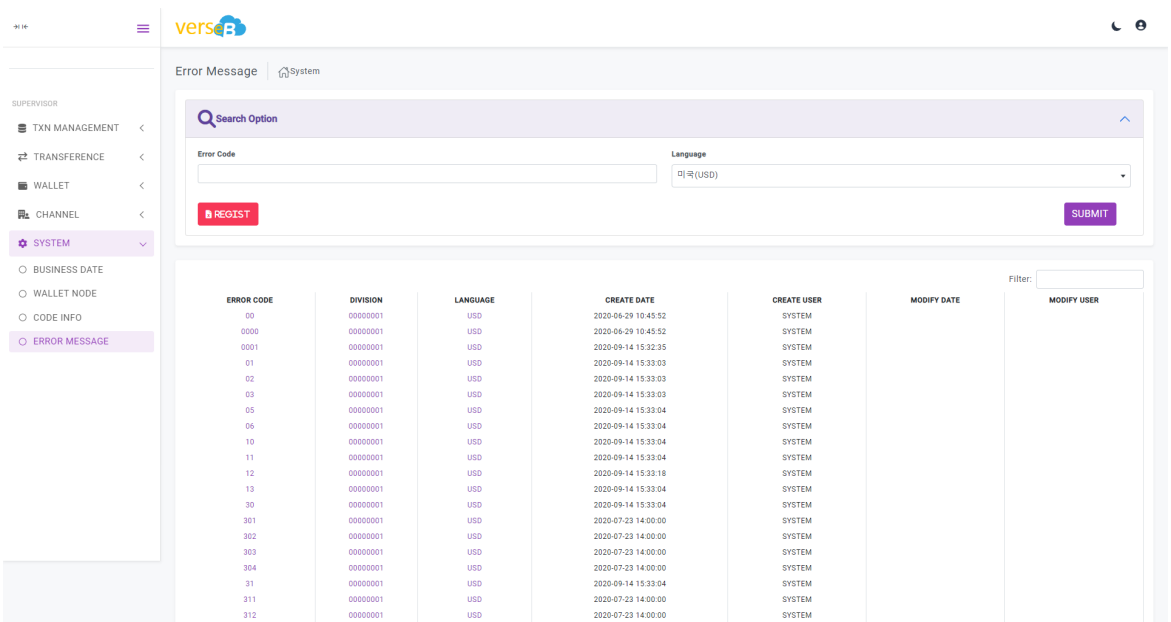


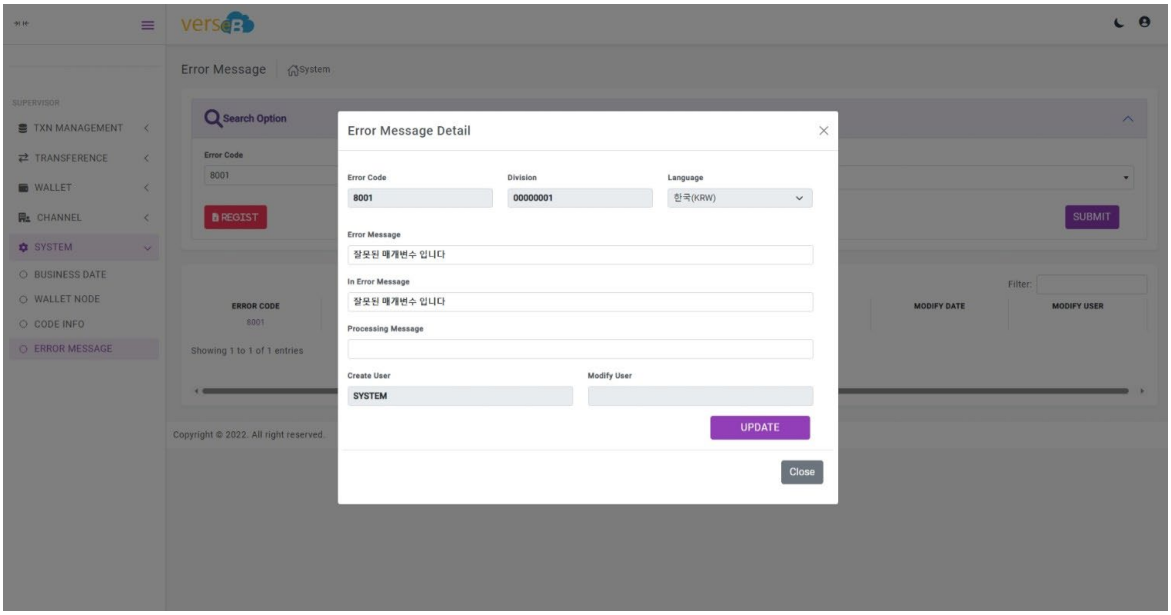


7. PCRM XTE WEB 3.0 ARCHITECTURE

PCRM ADMINISTRATOR FUNCTION

ERROR MESSAGE





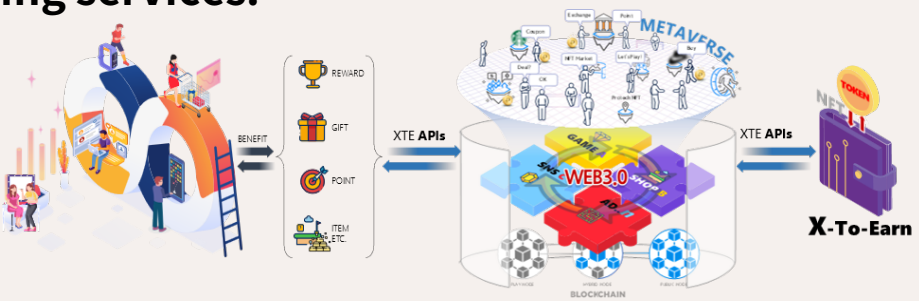
8. PCRM XTE WEB 3.0 APIs

PCRM XTE WEB 3.0 Service Overview

Many X To Earn (XTE)

various points/rewards and benefits in daily life as well as carbon reduction certification

Low-cost and high-efficiency blockchain WEB 3.0 services can be applied to various rewards/points and benefit information generated through personal, startup, and enterprise-operated platforms such as online shopping malls, communities, content, and gaming services.



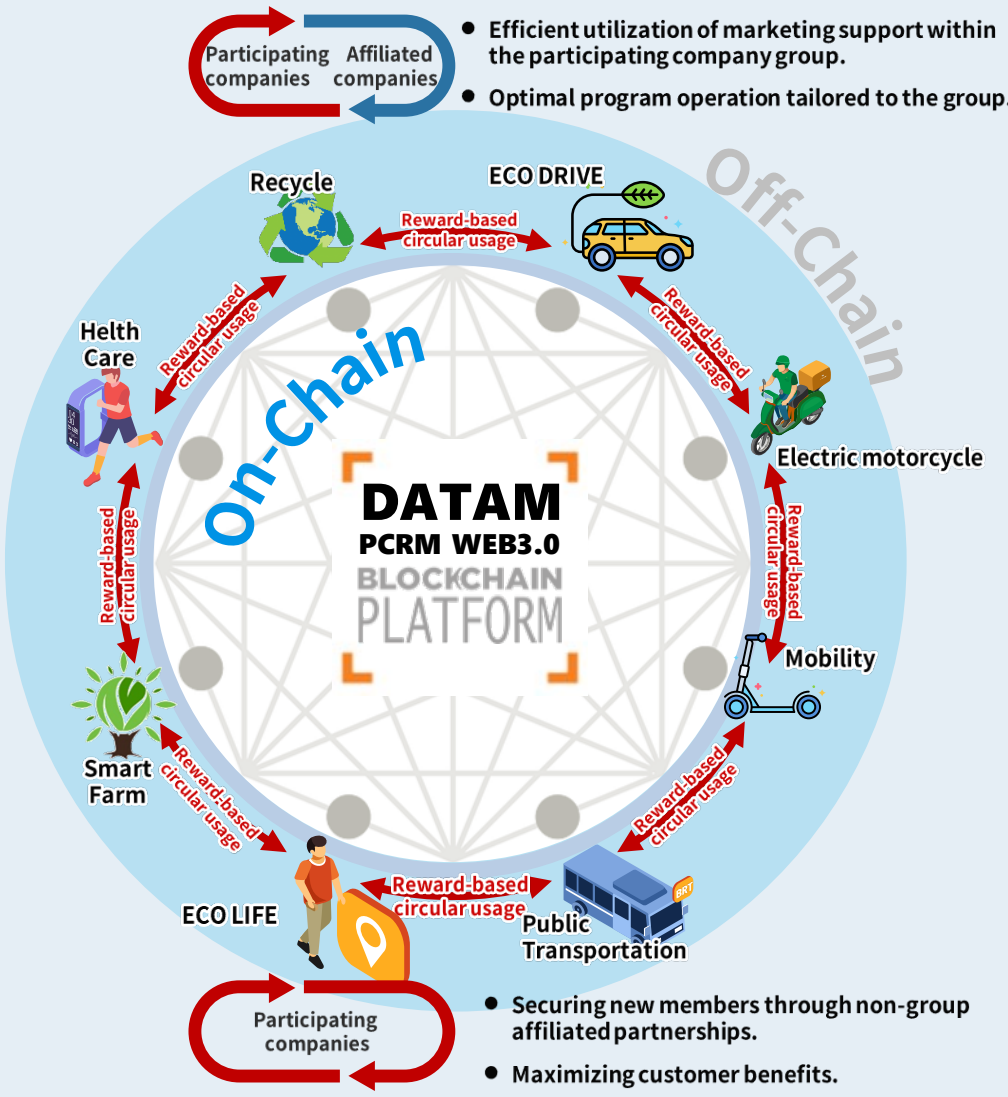
PCRM XTE WEB 3.0-based Circular Structure

A hybrid WEB3.0 platform service that combines the advantages of both closed and open models simultaneously.

WEB3.0 Strategy

Transition from participating companies to affiliated companies.

A structure where benefits accumulated through participating companies are utilized and circulated within affiliated companies.



A structure where benefits accumulated in participating companies are consumed in daily life and circulate.

Circulating from participating companies to daily life.

PCRM XTE WEB 3.0 Personal Data Protection and Marketing

Activation of customer marketing channels to expand synergy based on WEB3.0 personal information protection

Resolving legal risks through compliance with personal information protection

Liability and subject of regulation

- Obtaining consent for collection and use of personal information
- Consent to provide personal information to third parties
- Protection measures when consigning handling of personal information
- Processing of unsubscribed customer information
- Personal information handling and management policy

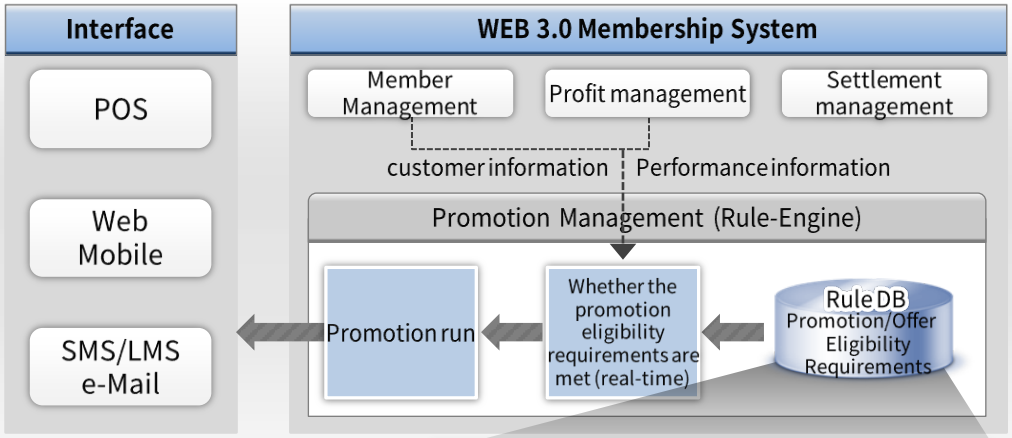
Implementation Considerations

Customer touchpoint

Procedure for consent to join	• Agree to WEB 3.0 Membership Terms and Conditions with Affiliates • Existing members agree to WEB 3.0 membership terms and conditions when using the service
WEB 3.0 Membership System	Encryption / Identification ID Restriction on display of personal information / Information provision history management Access log / Access Control

- Building Business Know-How for Personal Information Protection
- Implement consent procedures with minimal complexity while complying with legal requirements
- Systematization of regulatory requirements for personal information inquiry and management

Establishment of revenue base through rule-based promotion

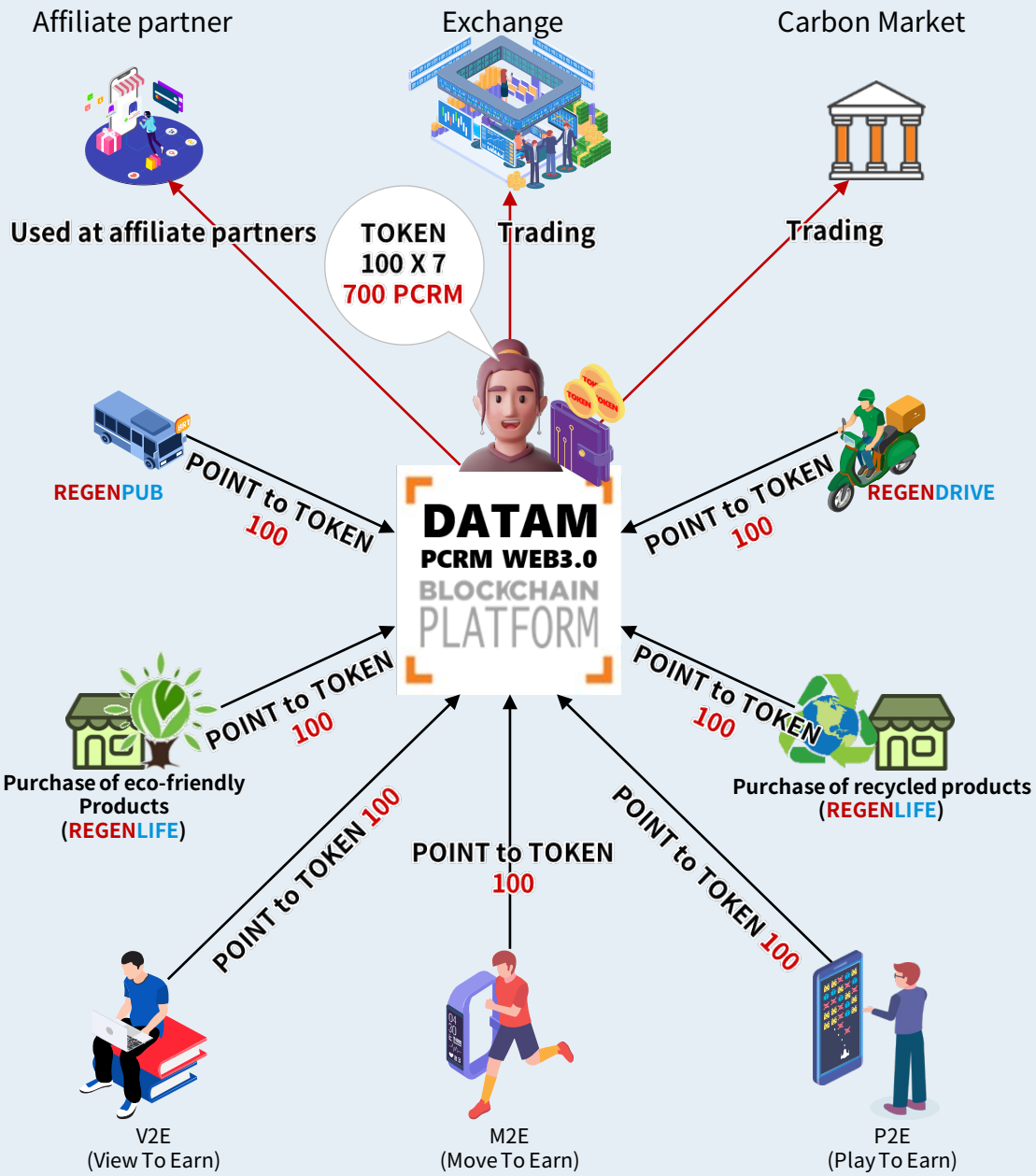


- Accept promotions of various requirements by applying the rules of promotion provision conditions
- Various promotions possible independently of participating companies and affiliates

Who	Gender, region, performance, etc.
When	Period, date, day of week, time zone
Where	Participating companies or affiliates (games, SNS, etc.)
What	Items, Points, NFTs, etc.
How	Exchange, Withdraw, Deposit, etc.

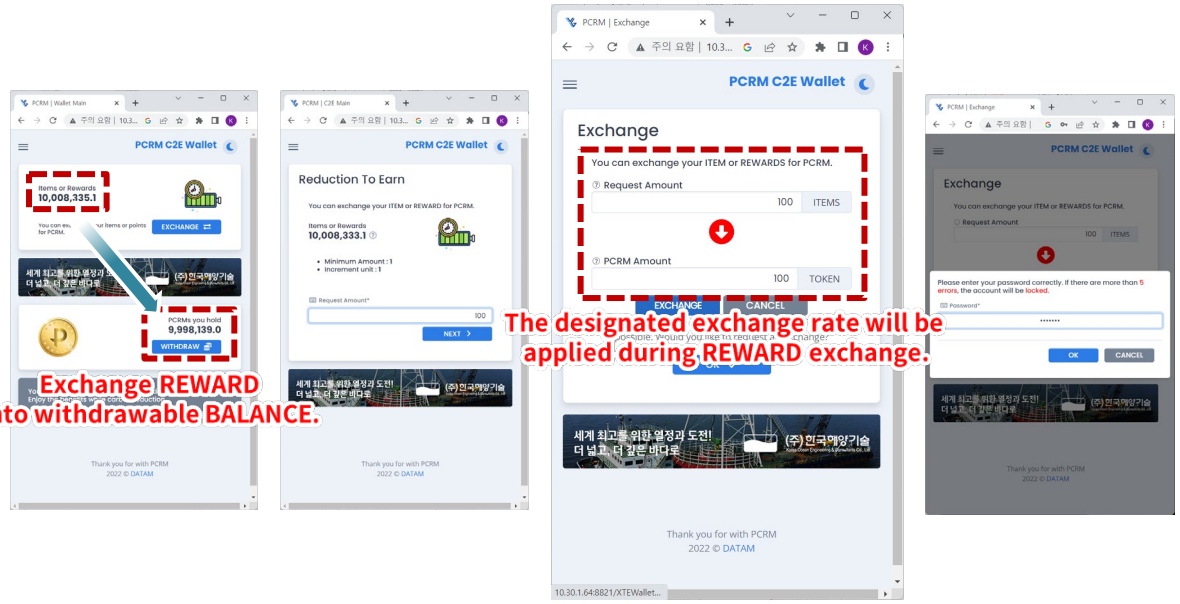
PCRM XTE WEB 3.0 Service Features

Existing operational services or new services can be conveniently built on the XTE WEB 3.0 integrated service based on blockchain technology. Users who participate in the WEB3.0 XTE platform ecosystem can receive services based on an integrated reward system.

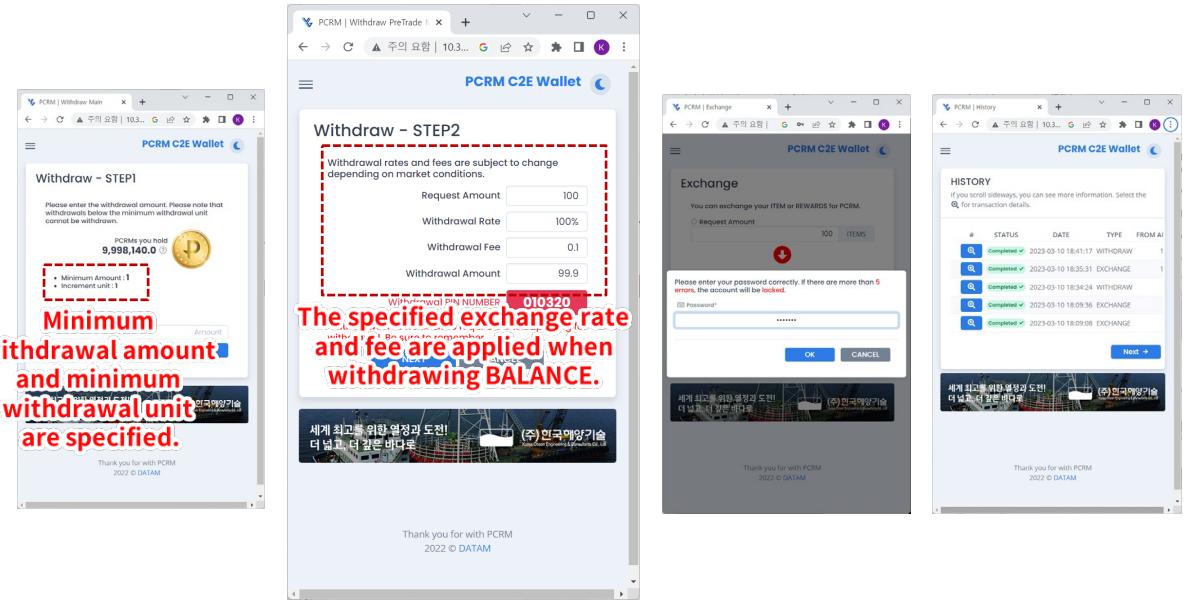


PCRM XTE WEB 3.0 Wallet Interface

EXCHANGE FLOW



EXCHANGE FLOW



PCRM XTE WEB 3.0 APIs LIST

API	FROM / TO	Function	Notes
Exchange Rate Inquiry	Partners → DATAM	Inquiry of the exchange rate for converting Climate Action or Partner company Points/Rewards to Private Tokens.	
Exchange	Partners → DATAM	Conversion of Climate Action or Partner company Points/Rewards to Private Tokens.	Async
Passport	Partners → DATAM	Authentication service for executing key APIs.	
Withdrawal Address	Partners → DATAM	Verification and registration of blockchain addresses for external use, owned by users of Partner companies (withdrawal addresses).	
Withdrawal pre-trade	Partners → DATAM	Preliminary withdrawal transaction	
Withdrawal	Partners → DATAM	Withdraw tokens eligible for withdrawal to an external address.	Async
Block Notify	DATAM → Partners	Send the blockchain processing results for the Exchange API and Withdrawal API (Confirmation of completion).	Async

※ PCRM XTE WEB3.0 API v2.0 is scheduled to be announced in July 2023.

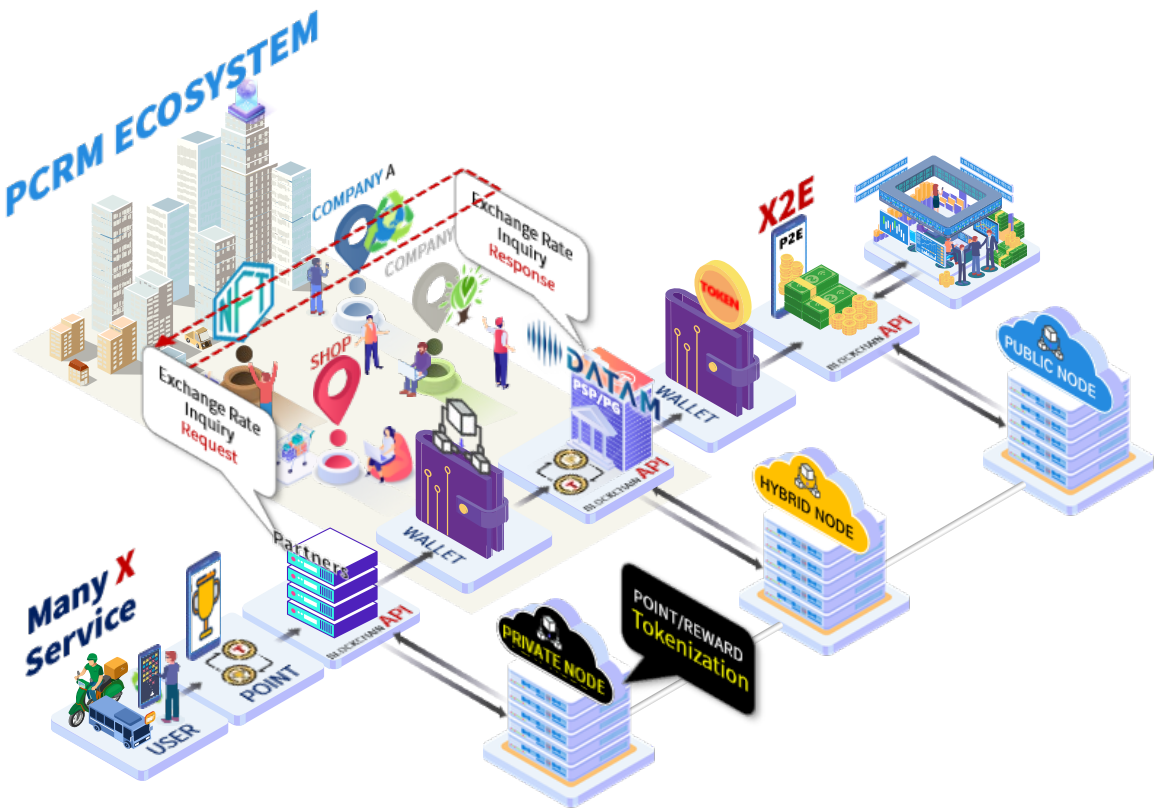
Exchange Rate Inquiry API

The Exchange Rate Inquiry API provides exchange rate information (Item, Point, etc. to PlayToken, PlayToken to Item, Point, etc.). You need to apply the exchange rate information from this API to the Exchange API.

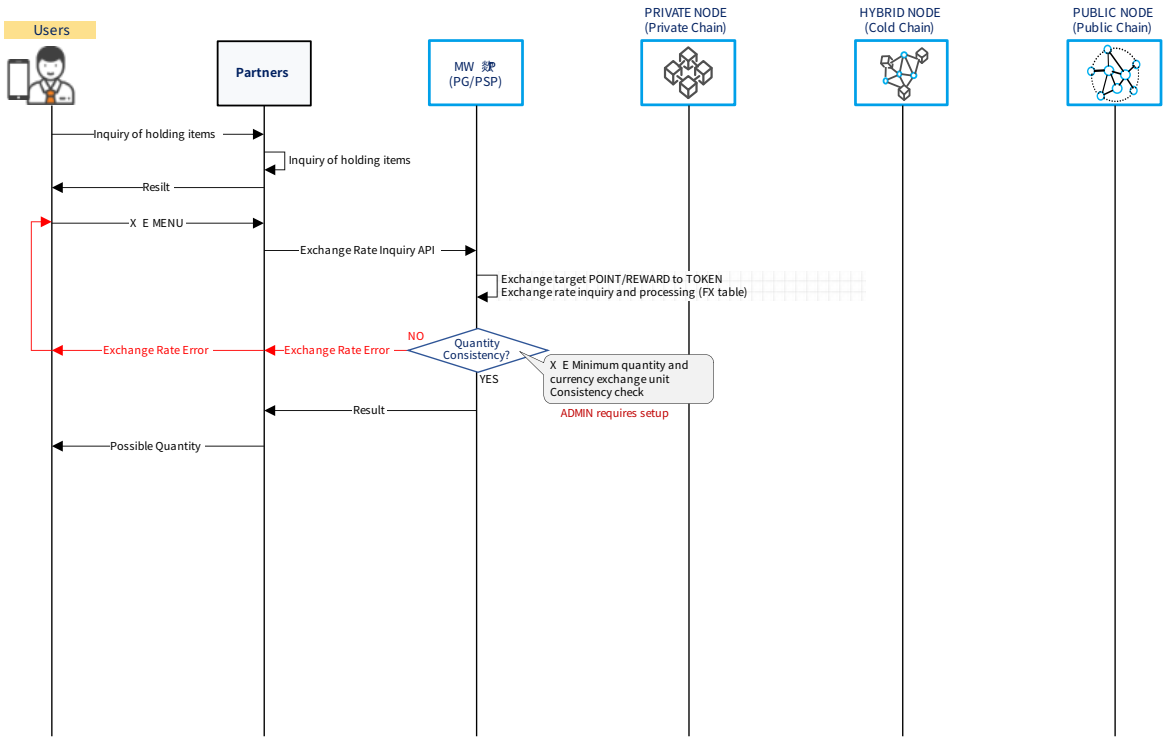
✓ **The exchange rate obtained from the Exchange Rate Inquiry API needs to be registered as a separate ADMIN transaction. If the exchange rate information is not pre-registered, an error will be returned.**

API	API URI	INSTANCE
Exchange Rate Inquiry API	/api/ExRate.json	PAY001CP0000003

POST [Content-Type : application/json]



Exchange Rate Inquiry API



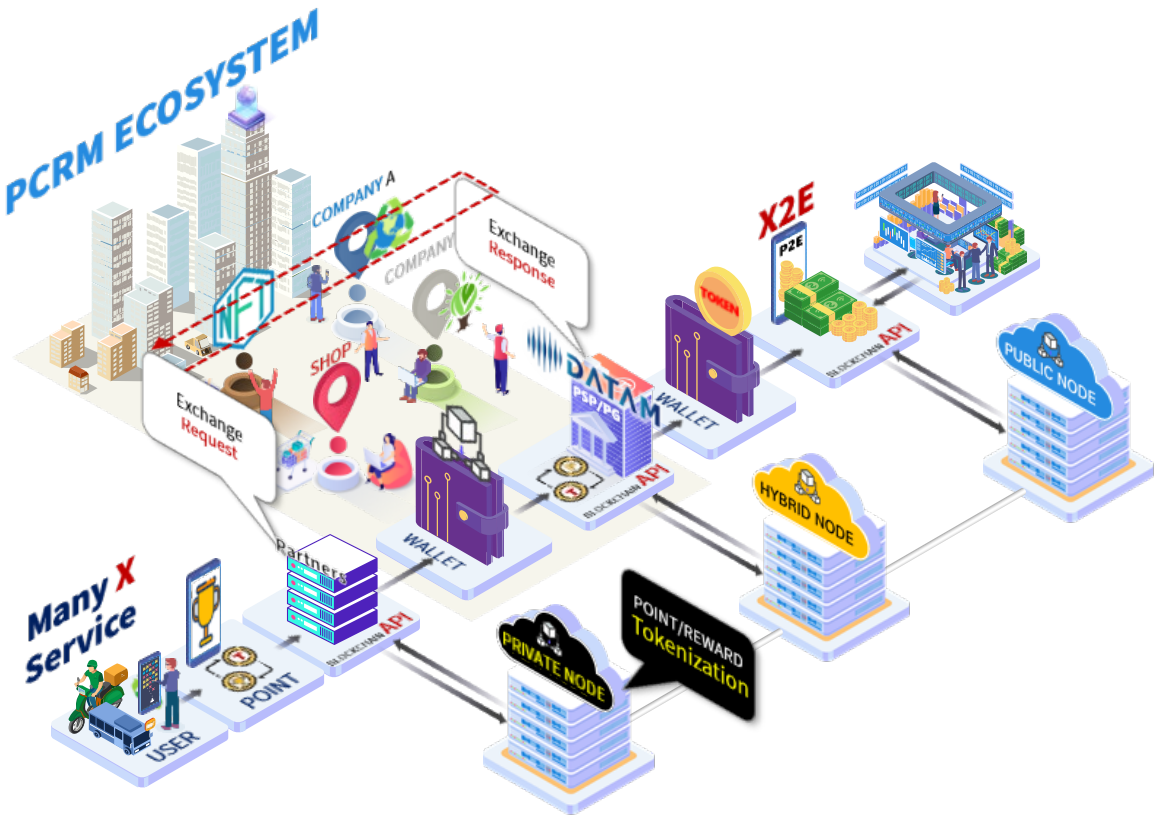
Exchange API

For the conversion of the request unit (items, points, tokens, etc.) held by the partner's users to the conversion unit (items, points, tokens, etc.), you need to use the Exchange Rate Inquiry API to apply the exchange rate information. This exchange rate information is necessary for making Exchange requests.

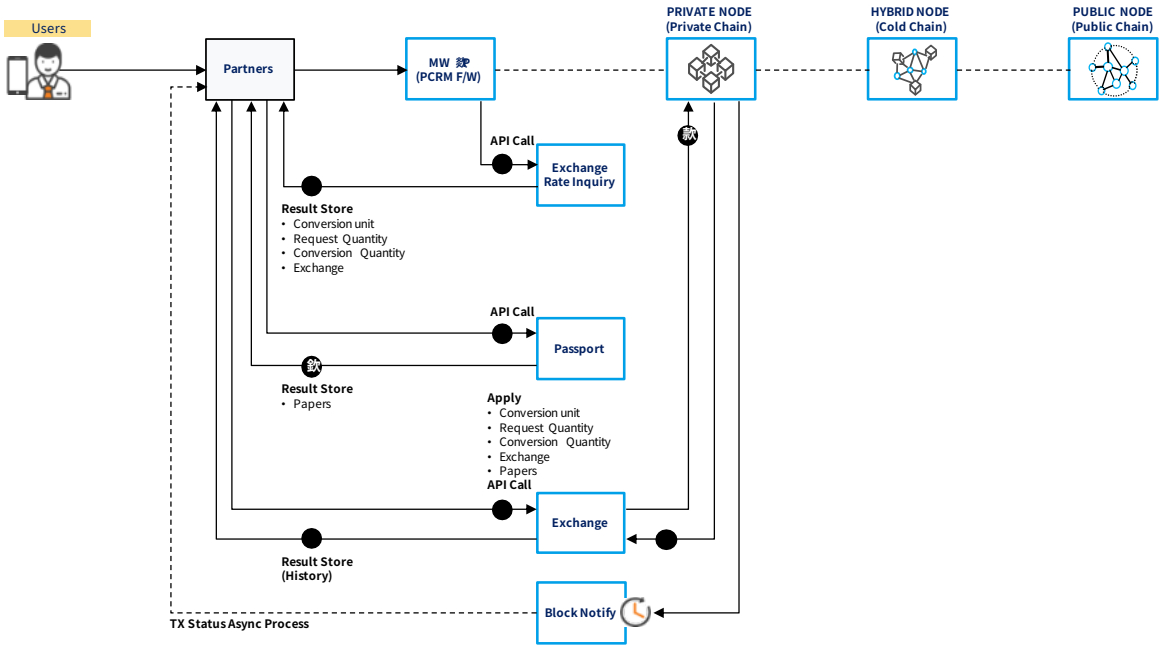
- ✓ **The Exchange API operates in an asynchronous (Async) manner. The processing result of the blockchain is delivered through Block Notify. Until MW30P provides a response via the Block Notify API, the Exchange is not considered complete.**
- ✓ **To ensure the management of a user's assets even in cases of device loss or damage, it is essential to have the user's unique key. This key allows for the secure management of the user's assets regardless of any changes or incidents involving their device (such as loss or damage).**

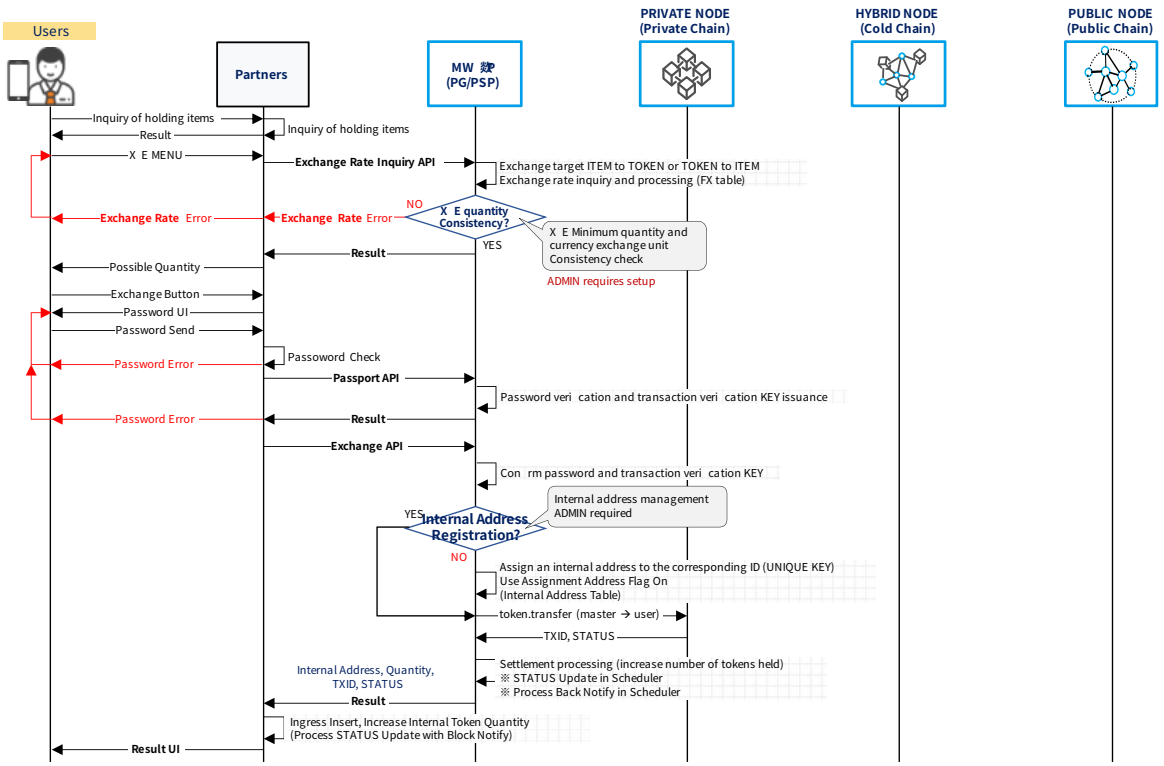
API	API URI	INSTANCE
Exchange API	/api/ExReq.json	PAY001CP0000004

POST [Content-Type : application/json]



Exchange API





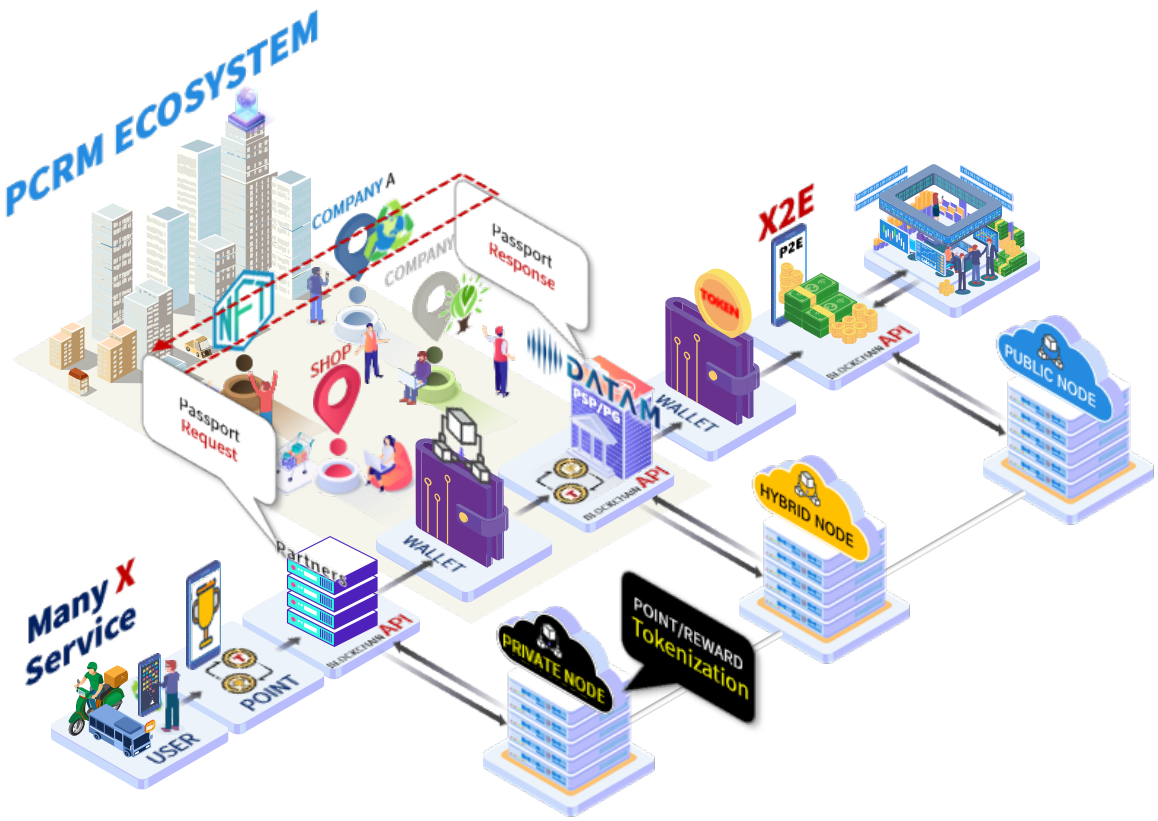
Passport API

The major services of registration, modification, conversion, and withdrawal through the Exchange API, Passport API (Password Change), Withdrawal Address API, and Withdrawal API should be executed after authentication using the Passport API.

✓ **The authentication method can be implemented in various ways, such as FIDO, pattern, 2FA, etc., in consultation with the partner company.**

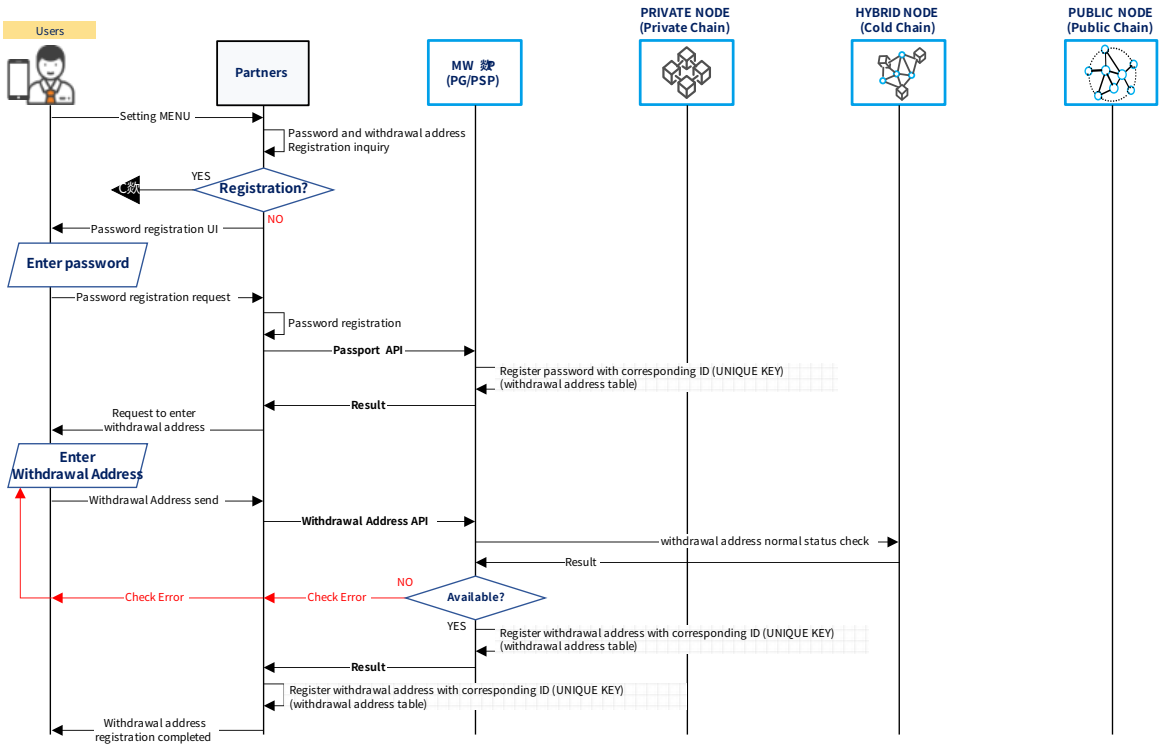
API	API URI	INSTANCE
Passport API	/api/RegOutPasword.json	PAY001CP0000006

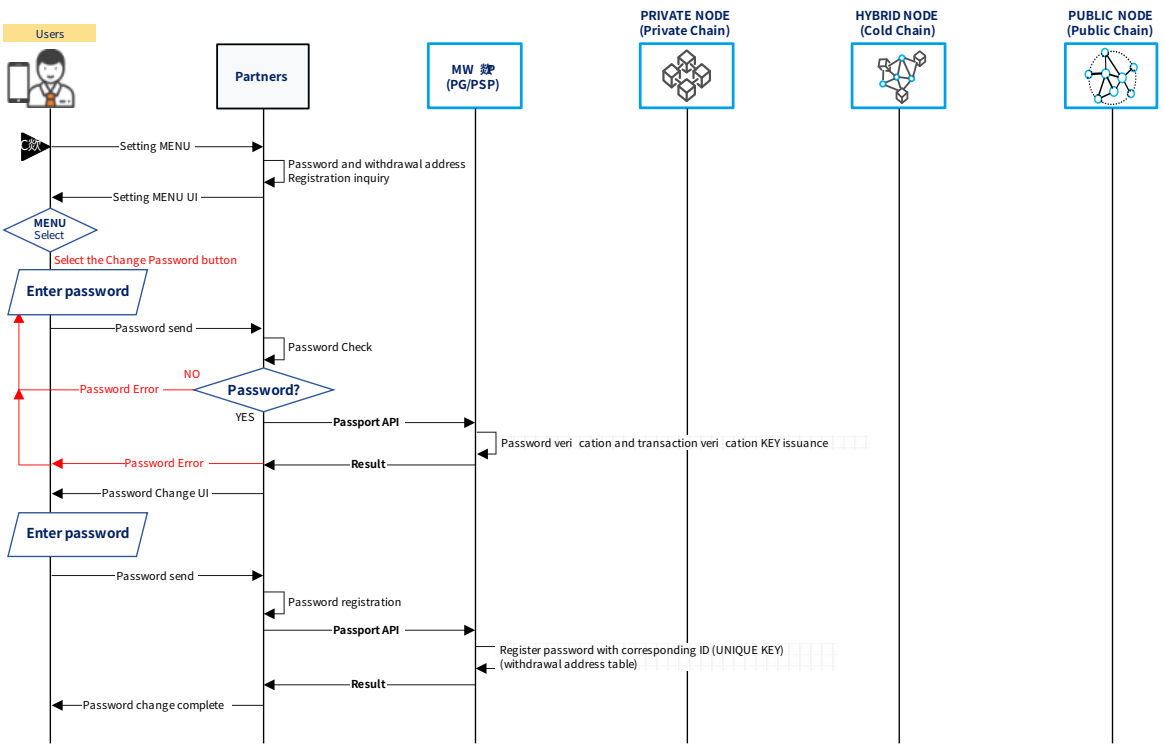
POST [Content-Type : application/json]



8. PCRM XTE WEB 3.0 APIs

Passport API





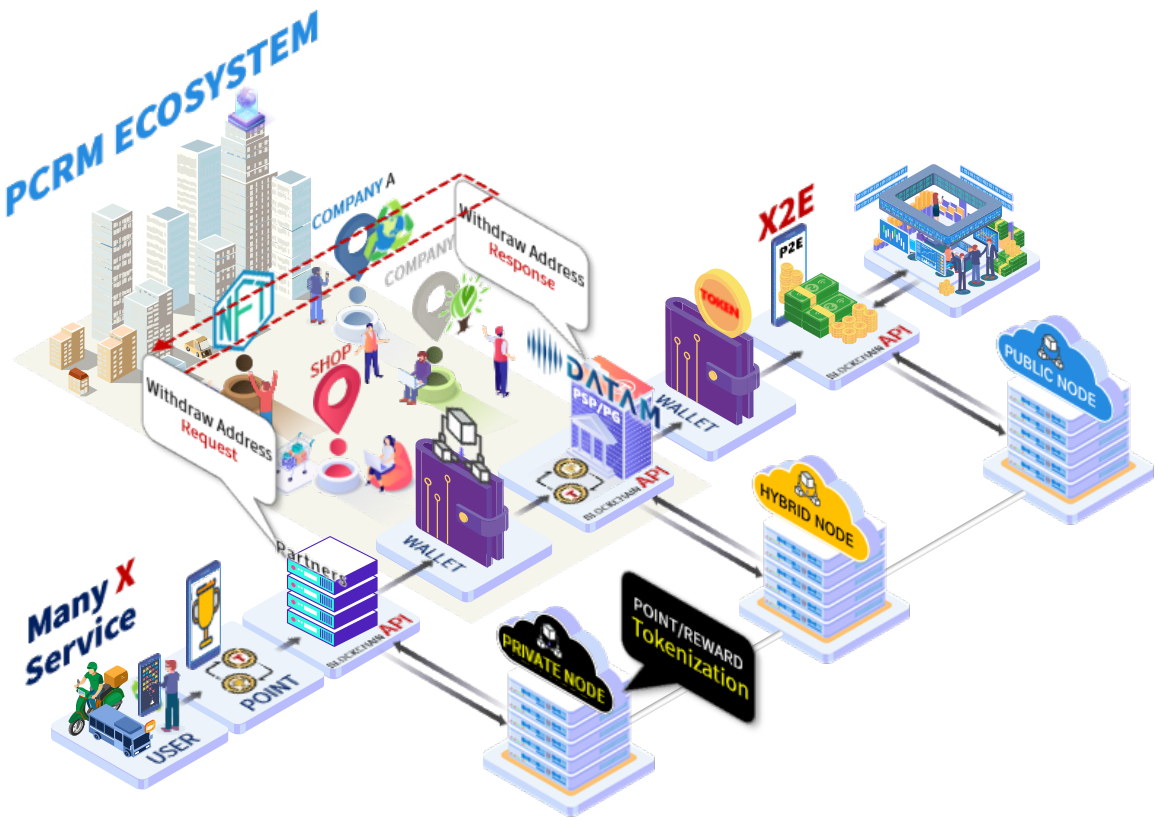
Withdrawal Address API

We perform verification and registration of the external address (usable in exchanges, etc.) to enable the partner company's users to use their PlayTokens (internal tokens) externally. Any losses incurred due to user's incorrect input of the external address will be the responsibility of the user.

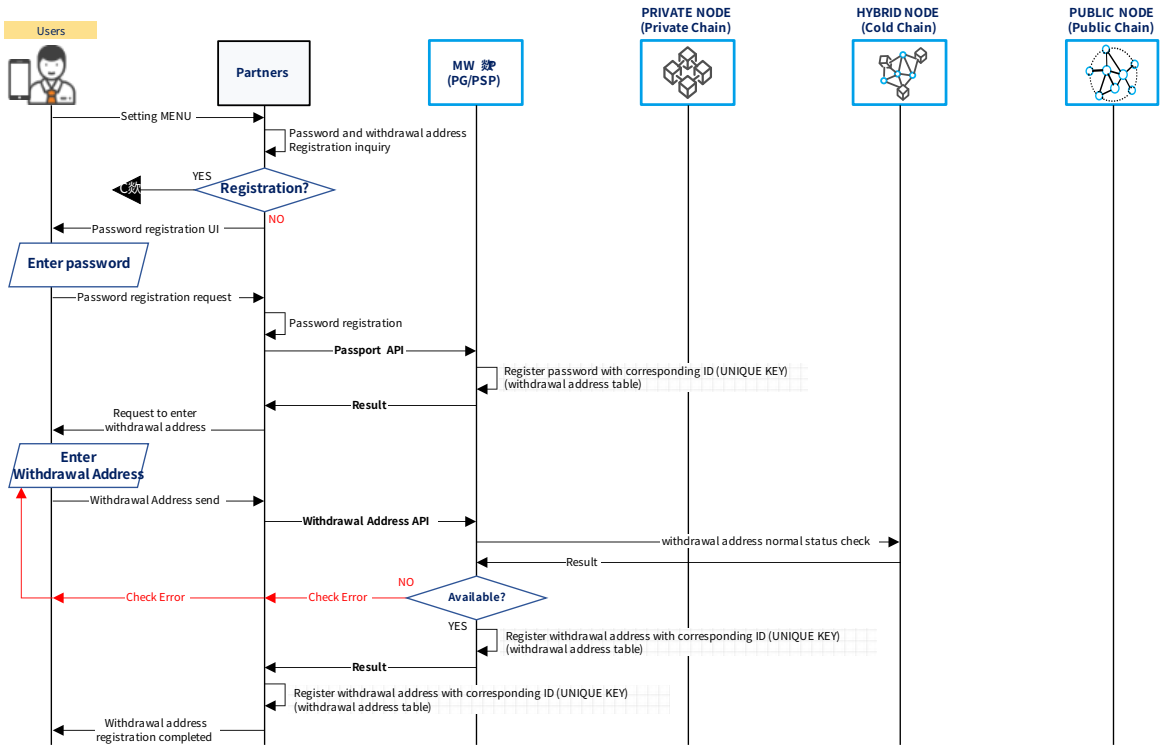
✓ **Currently, we only support EVM-based blockchains. However, we can expand to various blockchain models depending on the partnership and business alliance models with our partner companies.**

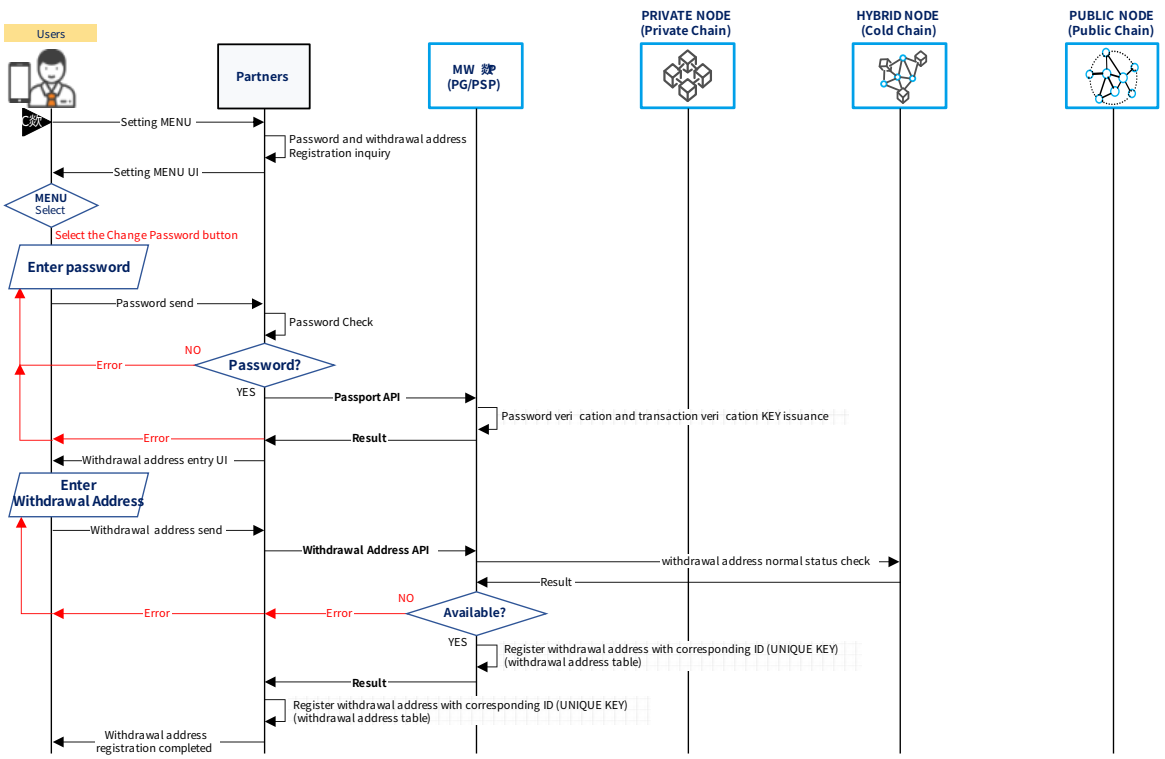
API	API URI	INSTANCE
Withdrawal Address API	/api/OutAddrVerify.json	PAY001CP0000005

POST [Content-Type : application/json]



Withdrawal Address API



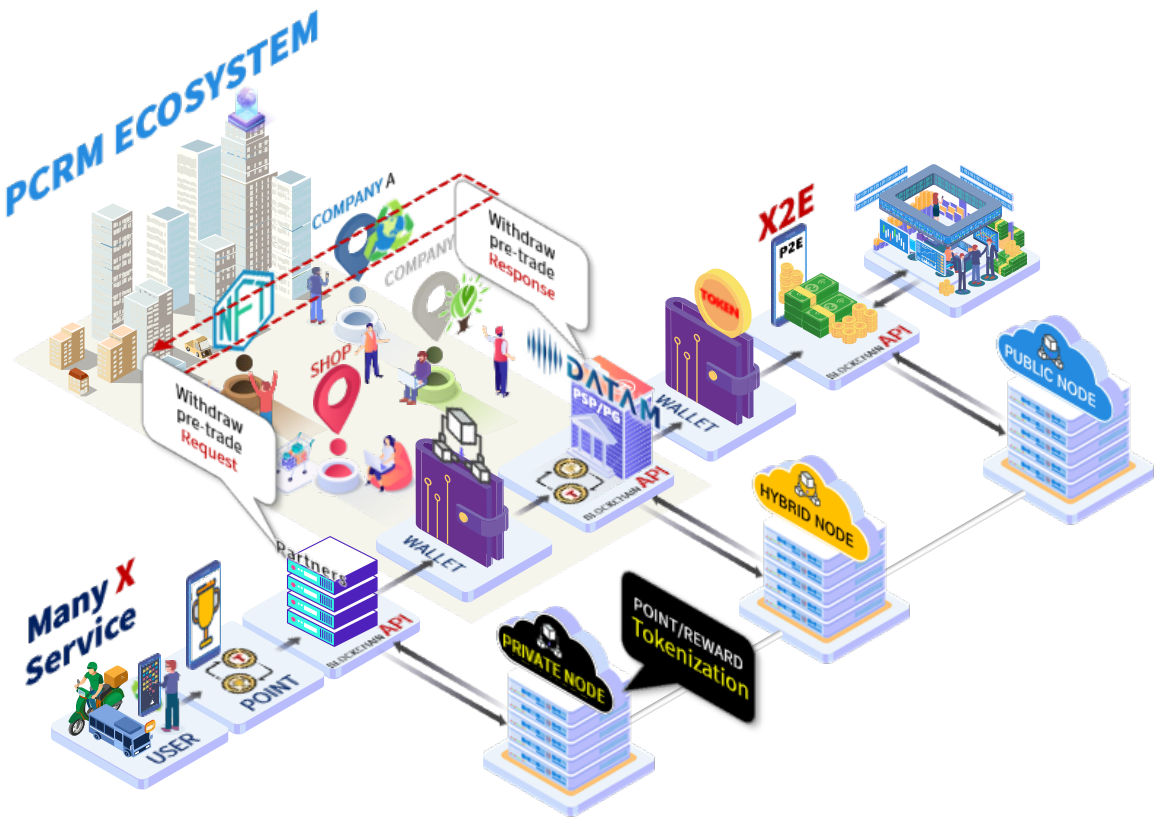


Withdrawal pre-trade API

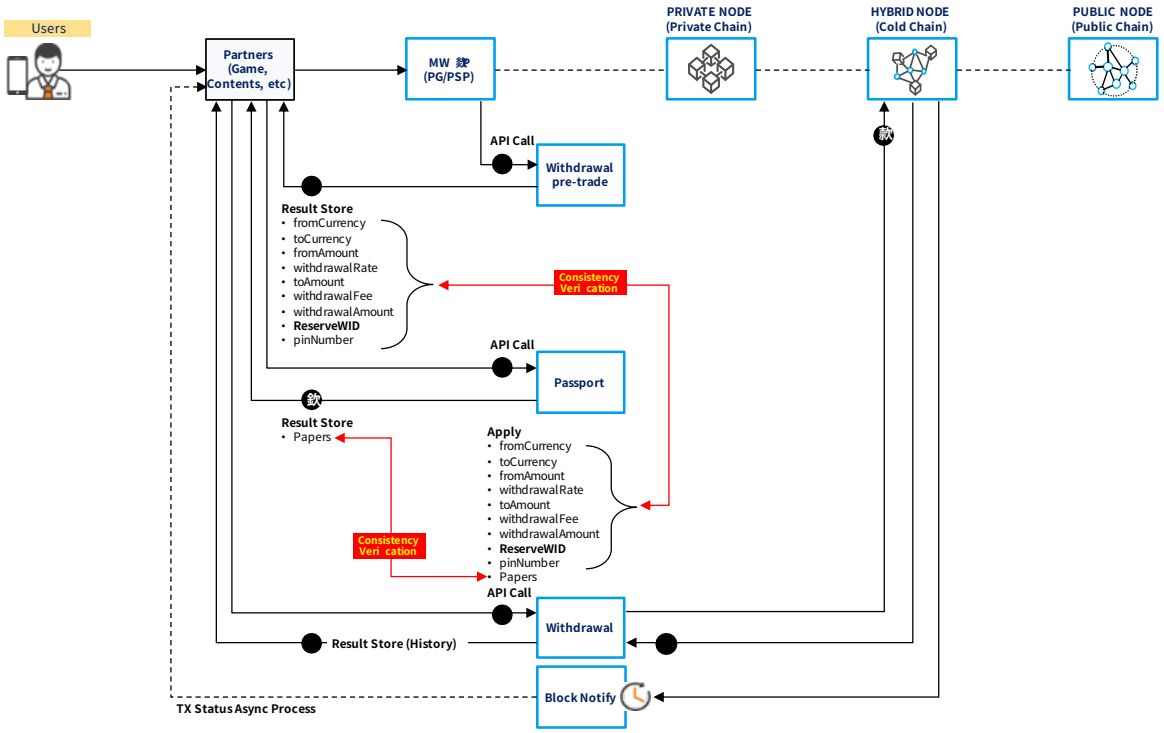
The Withdrawal Pre-Trade API must be executed before calling the Withdrawal API. The key data from the Withdrawal Pre-Trade API should be reflected in the actual withdrawal transaction using the Withdrawal API.

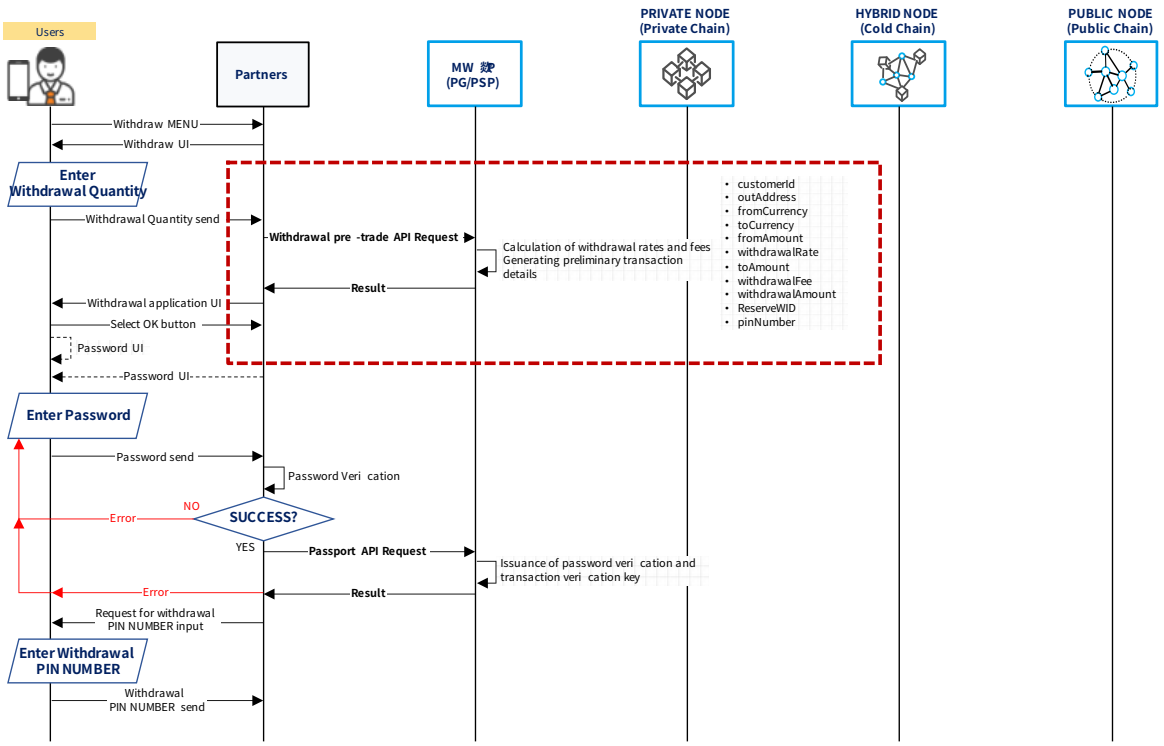
API	API URI	INSTANCE
Withdrawal pre-trade API	/api/Reqpretrade.json	

POST [Content-Type : application/json]



Withdrawal pre-trade API





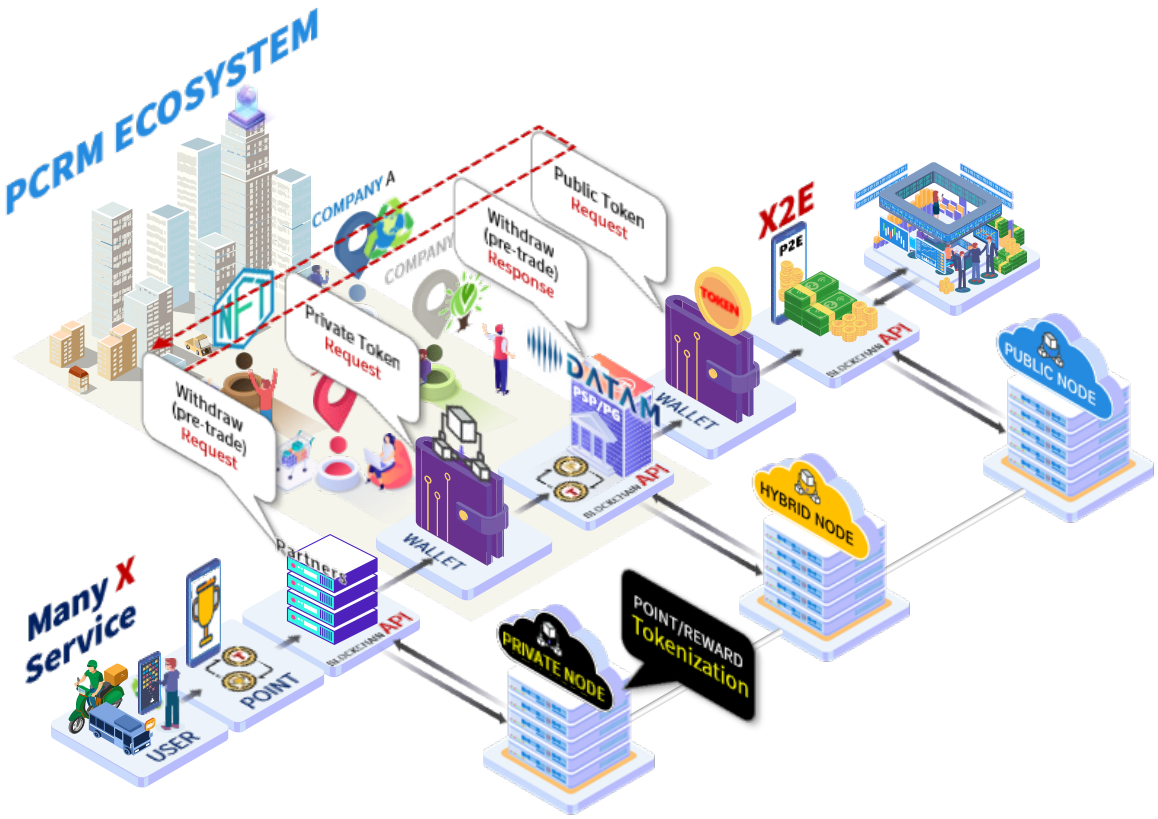
Withdrawal API

Withdrawal is a functionality that allows transferring internal tokens to an external address. The tokens transferred to the external address can be freely used in various fields such as exchanges.

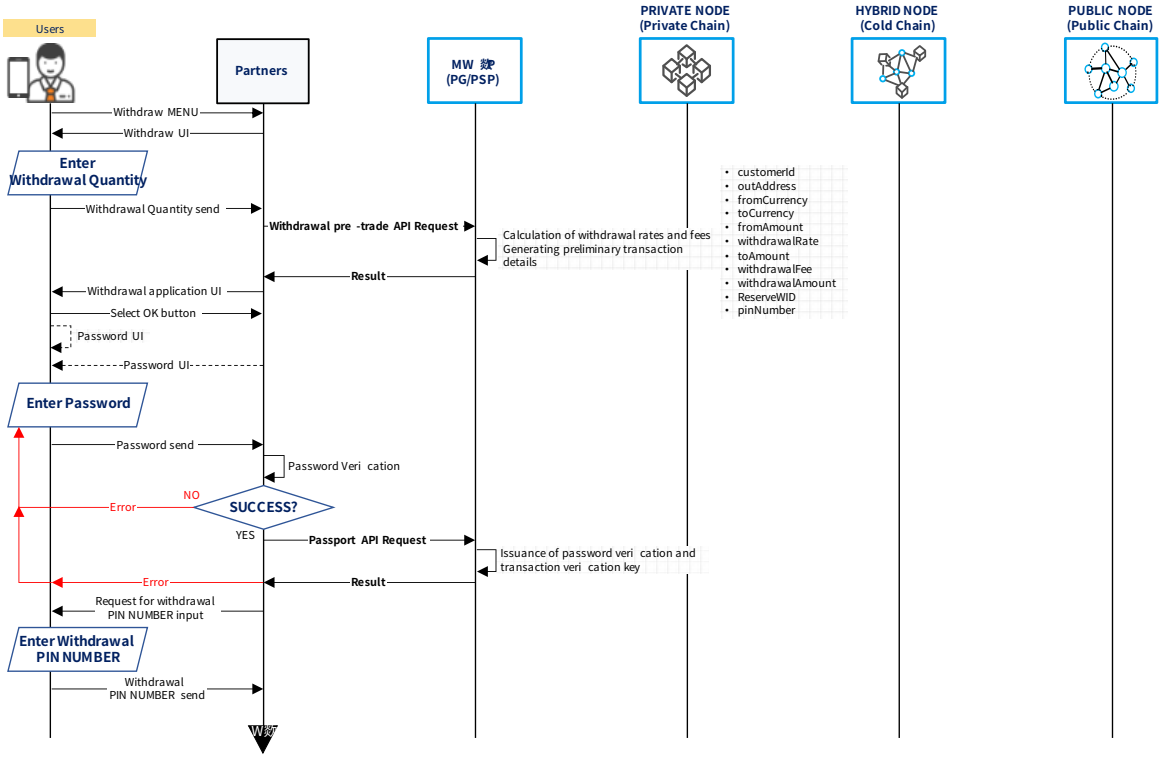
- ✓ **The Withdrawal API operates asynchronously. The final delivery of the blockchain processing results is communicated through the Block Notify API. It is important for partners not to consider the withdrawal process as complete until the asynchronously provided response results are received.**
- ✓ **Withdrawals can only be made to registered withdrawal addresses, and any issues related to incorrect withdrawal addresses or other problems lie with the user who registered the withdrawal address.**

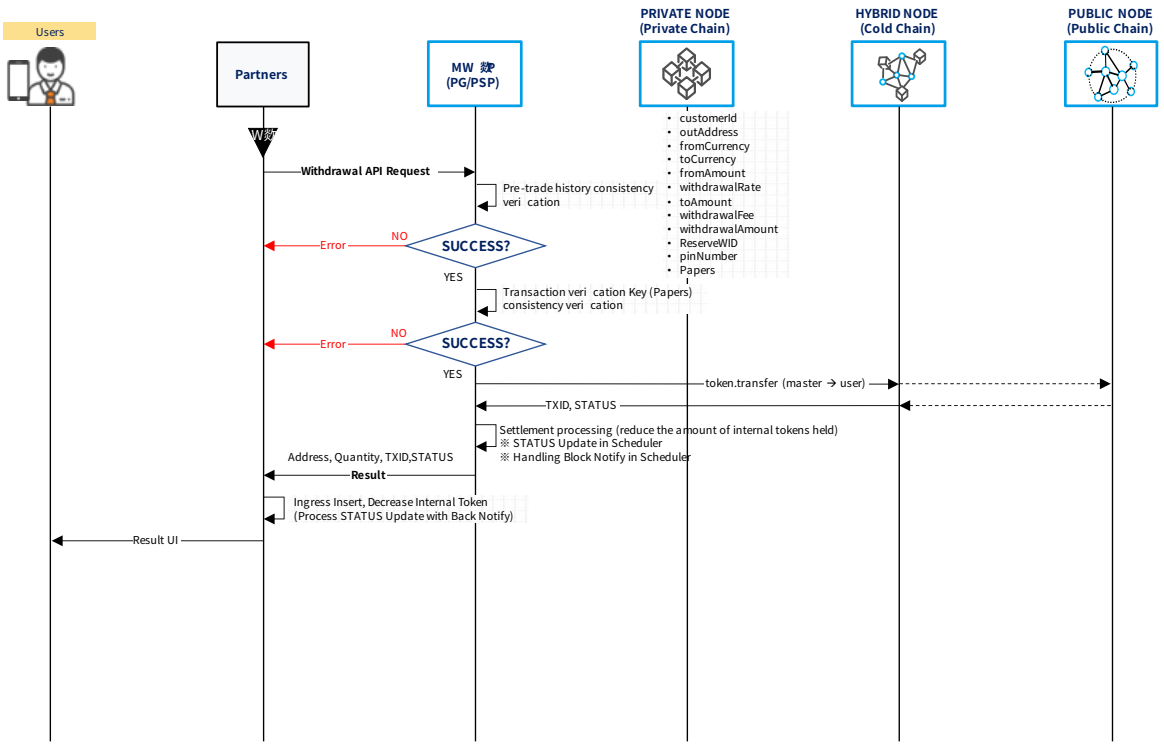
API	API URI	INSTANCE
Withdrawal API	/api/ReqWithdraw.json	PAY001CP0000007

POST [Content-Type : application/json]



Withdrawal API





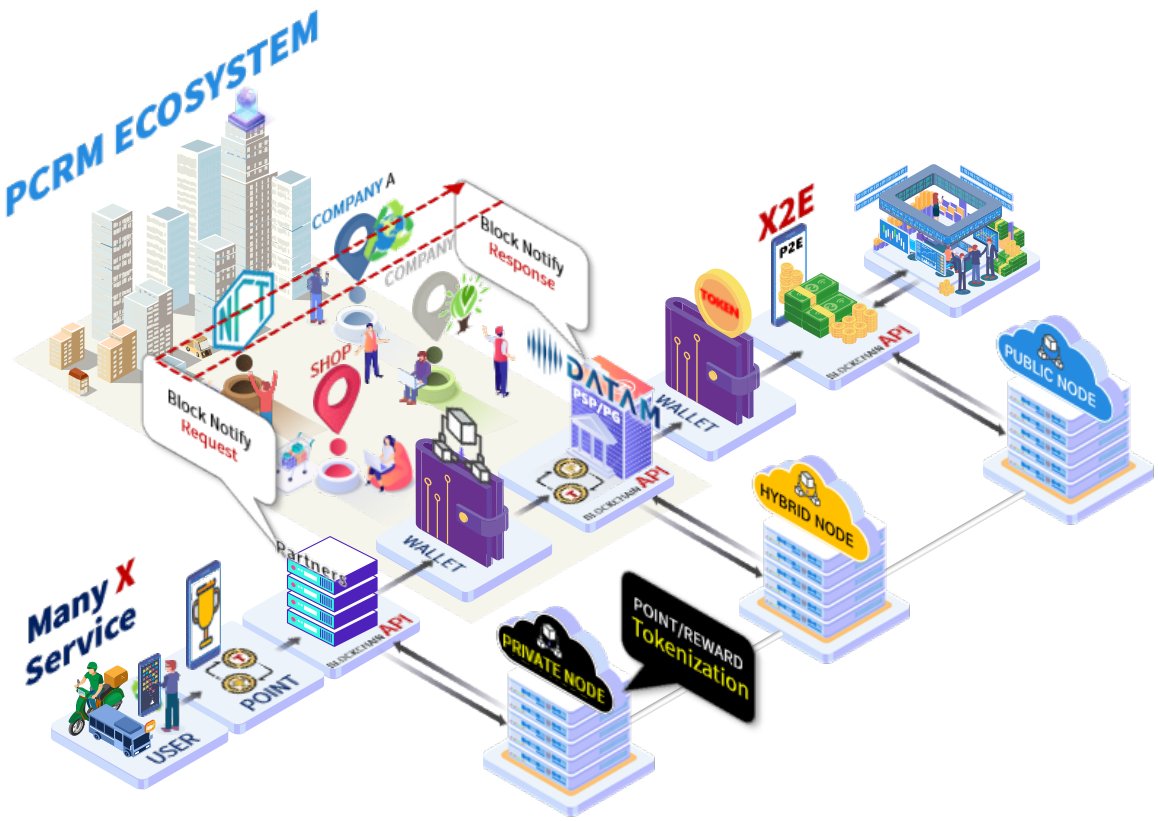
Block Notify API

The Block Notify API notifies the transaction processing result (block confirmation status) for major transactions related to blockchain, such as the Exchange API and Withdrawal API, using an asynchronous method to ensure efficiency.

✓ **There may be some delays depending on the status of the blockchain nodes.**

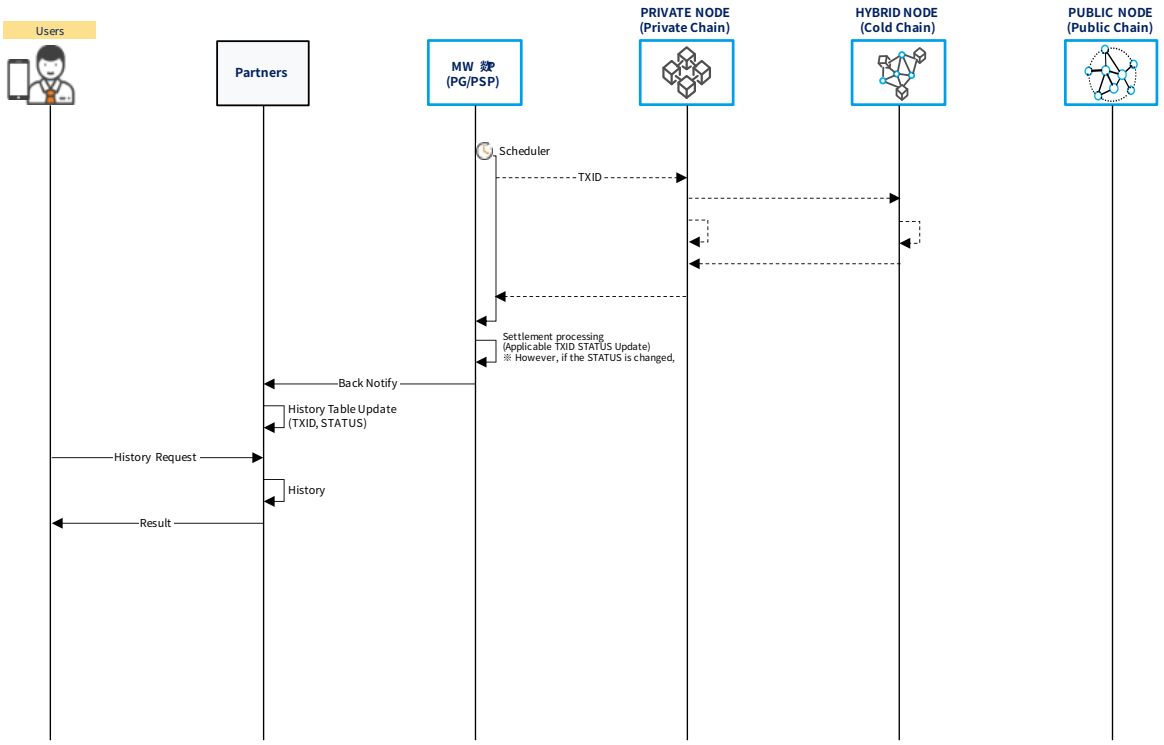
API	API URI	INSTANCE
Block Notify API	/api/Partners_URL	PAY001CP0000006

POST [Content-Type : application/json]



8. PCRM XTE WEB 3.0 APIs

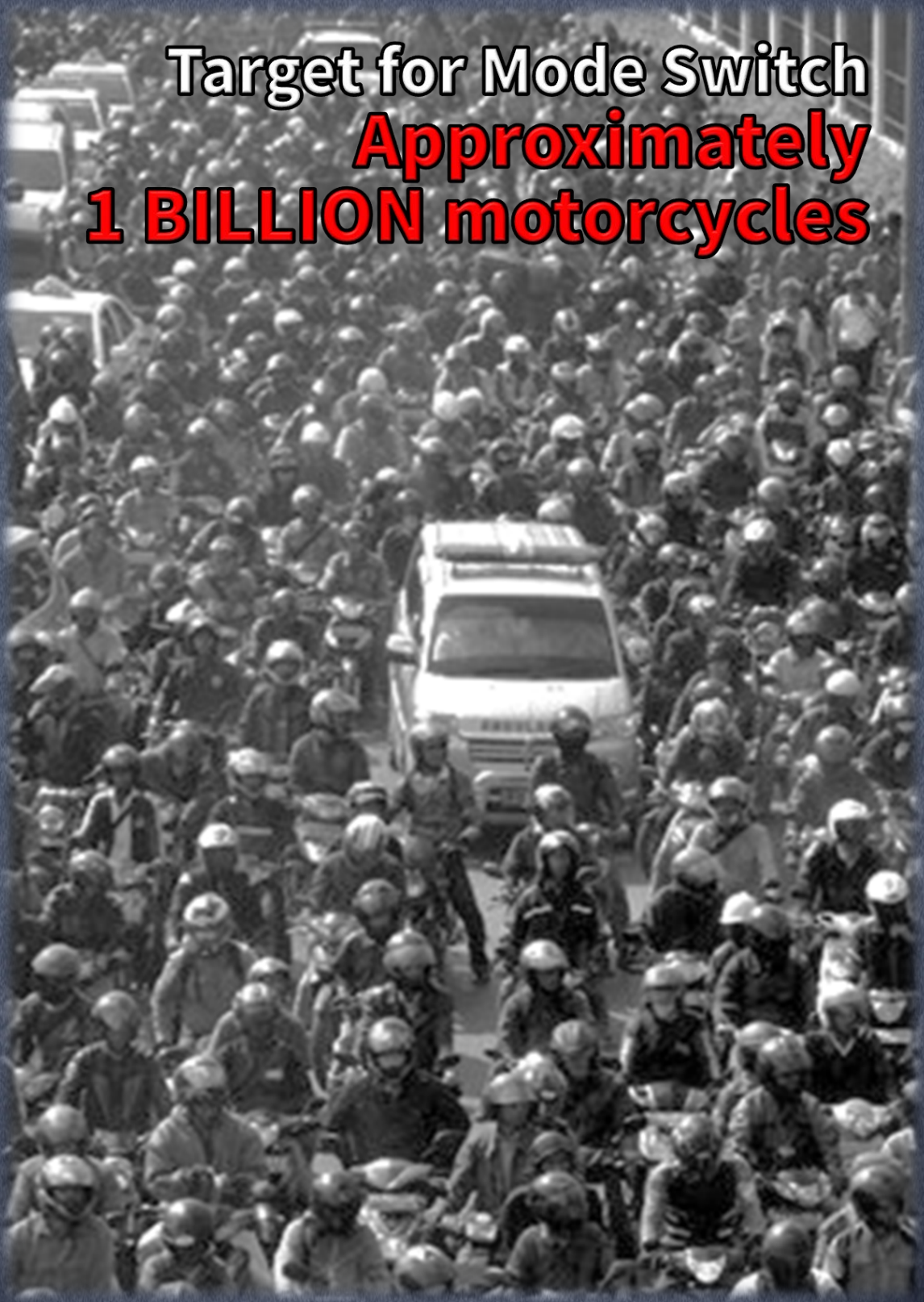
Block Notify API



9. GOALs

9. GOALs

Gradual spread of users through carbon reduction proof compensation

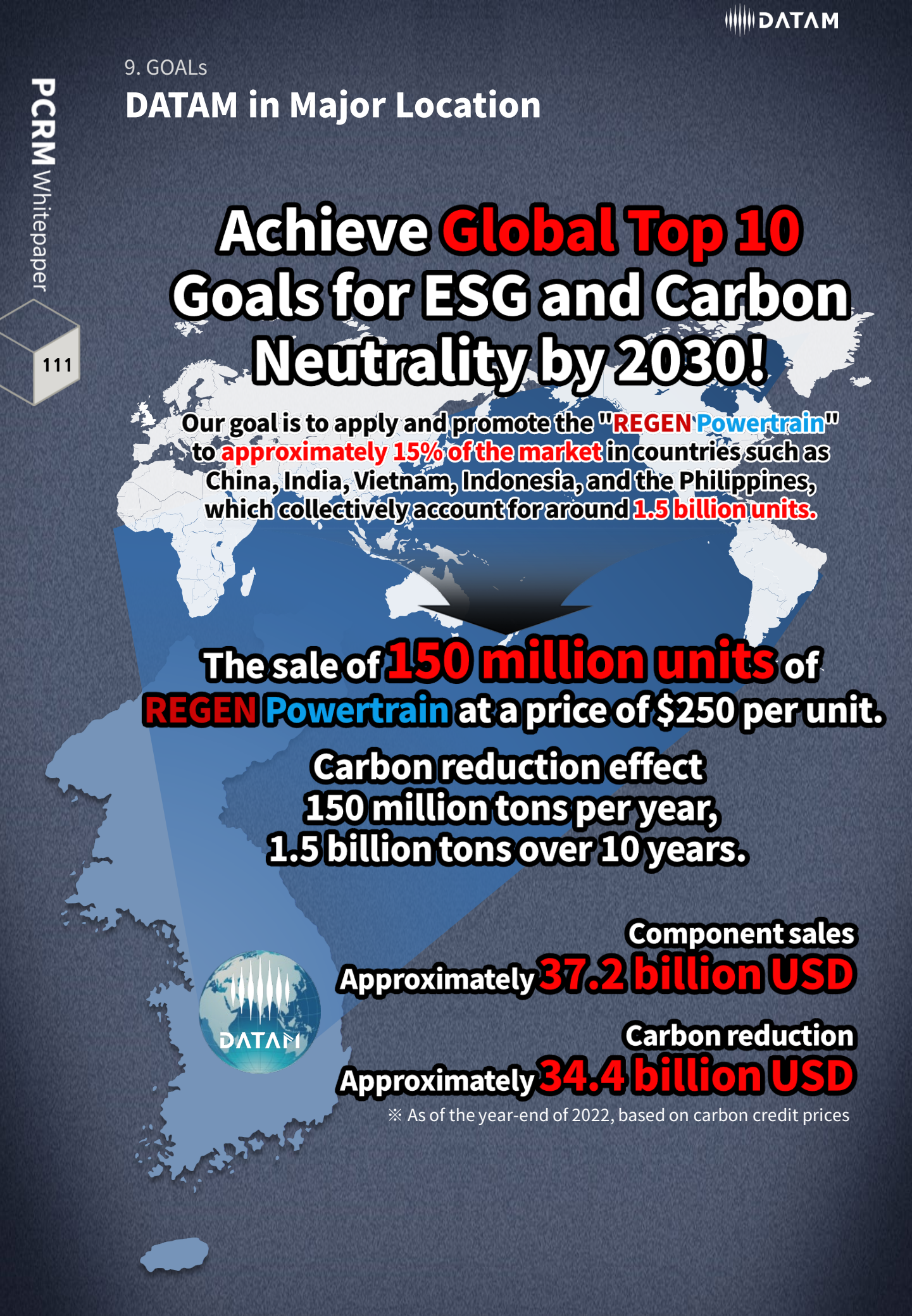


9. GOALs

DATAM in Major Location

Achieve Global Top 10 Goals for ESG and Carbon Neutrality by 2030!

Our goal is to apply and promote the "REGEN Powertrain" to approximately 15% of the market in countries such as China, India, Vietnam, Indonesia, and the Philippines, which collectively account for around 1.5 billion units.



The sale of 150 million units of REGEN Powertrain at a price of $250 per unit.

Carbon reduction effect
150 million tons per year,
1.5 billion tons over 10 years.

Component sales
Approximately 37.2 billion USD

Carbon reduction
Approximately 34.4 billion USD

※ As of the year-end of 2022, based on carbon credit prices

10. PCRM Information

about DATAM

Detaim is a specialized company in energy efficiency, low-carbon alternatives for transportation and mobility, based on carbon emission reduction patents for climate change response over the past 17 years.

With the development of the world's leading hyper-miling technology, which allows the longest distance to be covered with just 1 liter of fuel, and the introduction of Eco-Drive for energy efficiency in transportation, Detaim possesses the world's top-notch technology for measuring and reducing CO2 emissions from vehicles, contributing to the institutionalization and legalization of eco-friendly economy driving in South Korea.

The United Nations Framework Convention on Climate Change (UNFCCC) is an international agreement in which countries around the world have agreed to limit the emissions of greenhouse gases, including carbon dioxide, in order to prevent global warming.

The CTCN and CCC are supporting the UNFCCC.

United Nations Climate Change
Global Climate Action

DATAM

A consortium aimed at researching and applying blockchain technology worldwide to support the UNFCCC.

DATAM is a Leadership Member.

CLIMATE CHAIN COALITION

CTCN

DATAM is a registered company with CTCN.

CTCN is an international climate technology organization operating under the UNFCCC. It serves as the implementation arm of the technology mechanism under the UNFCCC and supports the transfer of climate-related technologies among countries. CTCN facilitates networking, information sharing, and capacity building to enhance climate technology cooperation and deployment worldwide.

PCRM Alliances

International organization

CLIMATE CHAIN COALITION

CTCN

Indonesia

Ministry of Industry REPUBLIC OF INDONESIA

IIEE Indonesian Institute for Energy Economics

WIKA

Elders

nujek

Bakrie

PT MOBIL ANAK BANGSA INDONESIA

UNITED BIKE

Philippines

KBL Kilusang Bagong Lipunan

HYMM

Vietnam

NSSC

SFDL

Laos

Korea

KOCECO

PLASMA Science

KEIDA 한국ESS산업진흥회 KOREA ESS INDUSTRY DEVELOPMENT ASSOCIATION

STS&P

ACE 에이스전자 ACE Electronics Co., Ltd

South Pacific CARBON CREDITS MANAGEMENT

Chemico ADVANCED MATERIALS Co., Ltd

JDHITECH (주)정도하이텍

DAEJI P&I

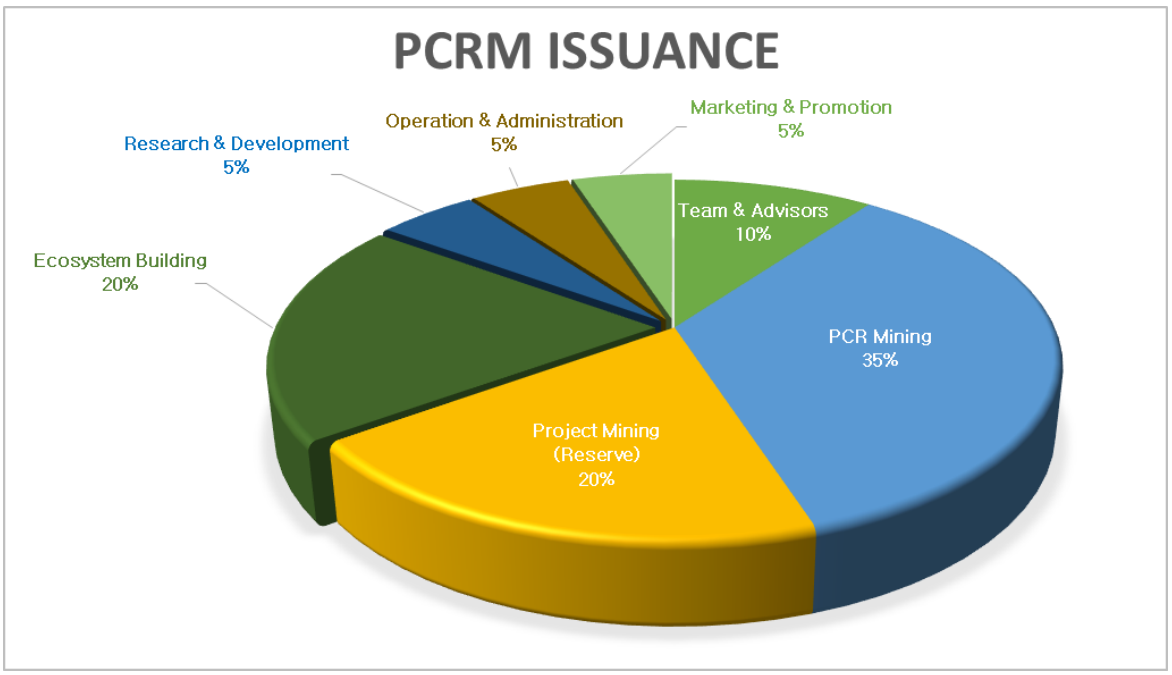
우만포럼

글로벌탄소재단

10. PCRM Information

TOKEN DISTRIBUTION PLAN

Item		Number of Issues (PCRM)	Ratio (%)
Team & Advisors		**350,000,000**	**10%**
PCR Mining		**1,225,000,000**	**35%**
Project Mining (Reserve)		**700,000,000**	**20%**
Token Sale			
	Ecosystem Building	700,000,000	20%
	Research & Development	175,000,000	5%
	Operation & Administration	175,000,000	5%
	Marketing & Promotion	175,000,000	5%
	Sub Total	**1,225,000,000**	**35%**
Total		**3,500,000,000**	**100%**



TOKEN LOCK-UP AND BURN SCHEME

Marketing & Promotion Token

Airdrops for new listing bonuses, promotions, etc., will be provided in the form of Marketing Tokens with a lock-up period of 3 months. The purpose and quantity of Marketing Tokens are aimed at benefiting all token holders through protocol activation and will be determined through voting in future governance.

Operation & Administration Token

Compensation for existing holders due to token supply increase and rewards for staking will be provided in the form of Operation & Administration Tokens with a lock-up period of 1 year. The purpose and quantity of Operation & Administration Tokens are aimed at benefiting all token holders through protocol activation and will be determined through voting in future governance. In case of insufficient quantity for Operation & Administration purposes, a portion of Ecosystem Building Tokens can be converted into Operation & Administration Tokens, and this will be decided through voting in governance.

Team & Advisor Token

A total of 10% of the tokens are allocated to the team in the contract, but they will be fully locked up until the completion of the PCR Blockchain Network mainnet. After the mainnet completion, the Team & Advisor Tokens can only be received according to a schedule determined by the foundation.

PCR Mining Token

The reward amount for carbon reduction mining by the PCR Blockchain Network (measured in tons of CO_2 equivalent reduction) will be calculated annually by the DATAM Foundation and ultimately determined by a vote in the governance process. The maximum amount available for mining is limited to 70,000,000 PCRM tokens per year. If the mining quantity falls below this threshold, any remaining tokens will be automatically burned.

Project Mining (Reserve) Token

The carbon reduction technologies and projects developed by companies other than DATAM can only be used as guarantees and are not directly integrated. However, a portion of the revenue generated from the sale of carbon credits is collected and burned to prevent an increase in the market circulation supply. This ensures that the carbon credits remain securely allocated and contributes to the goal of reducing carbon emissions.

※ The lock-up and burning of PCRM tokens, along with other policies related to token holders' benefits, are designed with the goal of benefiting all token holders. The official details and specific policies will be determined through voting in the governance process and announced in the future. The foundation is committed to creating transparent and inclusive decision-making processes that align with the interests of the token holders.

10. PCRM Information

OUR TEAM

CEO Chang-Deok LEE

ICT and PLM(Product Lifecycle Mangement) specialist

- University of Ulsan, Materials Science & Engineering
- Korea Advanced Institute of Science and Technology, Industrial & System Engineering
- IRRIS Corporation CEO and CSO.
- AONE Information Technology CSO and Managing Director.
- Zinnotech Inc VR/AR/MR, AI, Smart Factory Development Director
- Autodesk Korea Industry Territory Sales Executive
- Samsung SDS CAx/PLM Senior Project Manage
- R&D (Science & Engineering)
  - Korea Institute of Machinery & Metals [KIMM]
  - Korea Electrotechnology Research Institute [KERI]
  - Daewoo Aerospace Research Institute [DARI]
  - Joint representative of Eco Drive National Movement Headquarters
  - Secretary General of the International Eurasia
- SI@IT (System Integration @ Information Technology)
  - Daewoo Heavy Industries & Machinery Co., Ltd. [DHI], CAE Engineer
  - Samsung SDS Co., Ltd., Project Manager, Consultant & Auditor
  - Autodesk Inc., Industry Territory Sales Executive (Director)
  - Zinnotech Inc., Business Developer, Project Management Officer

OUR TEAM

VICE PRESIDENT **James Lee**

Transportation policy expert, environmental activist

- Traffic policy expert, environmental activist, businessman
- Graduated from the third ROK military academy
- Discharged as a captain of the army
- A founder and representative of DATAM LIMITED in Hong Kong
- Chairman of Smart Eco Inc. and PCR system Inc.

✓ Major activities

- CCC(Climate Chain Coalition) Team Member - Leadership and
- Partnerships
- Permanent representative of the Korea Future Transportation Association
- Joint representative of Eco Drive National Movement Headquarters
- Secretary General of the International Eurasia Railroad Association
- Chairman of Eco Drive International Rally

✓ Performance in professional field

- holds 7 patents in the field of automotive GHGs (Greenhouse Gases)
- reduction and automotive engineering
- first to launch projects related to Eco Drive in Korea (2006)
- Eco Drive School Management (2007-2009)
- host an Eco Drive Policy Forum (2007-2012)
- world's first progress in UN CDM certification (2010~)
- progress a policy project on CO2 Zero Zone project in the field of automotive road (2012)
- establish Eco Drive monitoring center (2013)
- developed the World's First PCR (Proof of Carbon Reduction) Block Chain System (2018)

EVP/CCO **Paul Jeong**

Ph.D in environmental engineering

- PCR Systems Inc.
- DATAM's technology development and project planning
- Technical researcher of Climate Chain Coalition (CCC) supported by UNFCCC

✓ Eco-driving design using automotive monitoring system

✓ 5 papers in the field of eco-driving experiments and calculations.

✓ Holds 7 patents in automotive engineering

HEAD CTO **Kyung-Jeong Park**

Master of energy and electric motorcycle technology

- Electric mobility powertrain expert (motor, controller, battery)
- 45 patents related to motor manufacturing facilities
- 30 patents related to electric vehicle parts

✓ **Presidential Award (Industrial Packaging), Minister of Commerce, Industry and Energy Award**

✓ International Invention Fair in Germany (2005), Seoul International Invention Fair (2005), Geneva International Invention Fair in Switzerland (2006, 2008), International Invention Fair in Pittsburgh, USA (2006), etc.

10. PCRM Information

OUR TEAM

Head of DATAM Laboratory

Dr. Kwang-ho, Ko

- professor of Pyeongtaek University Ph.D in automotive engineering
- general manager of DATAM's eco-drive technology development
- CCC (Climate Chain Coalition) team member as researcher for technology and R&D

DATAM Laboratory

Dr. Dong-won, Lee

- Professor at the Ajou Motor College.
- Advisor of DATAM's eco-drive technology development

Head Director of Carbon Emissions Certification and Transactions

Dr. Hee-chan, Do

- Electrical engineering
- Carbon Emissions Certification and Transactions CTO of South Pacific Co., Ltd.
- charge of carbon credit certification and transaction

General manager of blockchain technology development.

Dr. Gab-rae, Lee

- Received doctor degree from Kyungpook National University
- A general manager of DATAM's blockchain technology development

Head CTO

Dr. Christopher van Kim

- Natural Language Processing
- ERP / Smart City / Urban Planning Specialist Deep Sea Scientific Drilling Program Manager Geological Survey / Geophysical Survey / Director of KOCECO Convergence Technology Institute

Chief Information Security Officer

Dong-hyeok Cha

- Search engine development
- Web development and SM project (Korea LH Corporation)
- Web and sidebar development project using AJAX

10. PCRM Information

OUR TEAM

CSO and CTO
Eunbok, Kim

- SK, KB Datasystems, KB Bank
- Financial Supervisory Service Security Integrity Consulting
- Building an enterprise financial system design
- Financial blockchain system design and construction

CIO
Eunteak, Lim

- SK, KB Datasystems, KB Securities
- Blockchain and Fintech Service architect (Payment Service Provider)
- Standard Chartered Global Mobile Outdoor Sales System Consulting
- 30 years of financial IT experience

Blockchain technology developer
Jin Wook Lee

- blockchain development / Cryptocurrencies / Software development/ Web development

Technical Director
Kim Joo-young

- Graduated from Dankook University (Bachelor of Science / Major: Biology)
- CEO of Unfailing Friend Insurance Co., Ltd. (trade, insurance)
- Smart CS Co., Ltd. (advertising, consulting) established, present, representative

Technical Director
Bokgyun Mun

- Ducks Ticket Technical Director
- Development Team Leader of Dot Name Korea Co., Ltd.
- Head of development team at Waplus Co., Ltd. Director of Technology at Osquare Co., Ltd. Technical Director of Unfailing Friend Co., Ltd.

Researcher
Jae-Hyung Kim

- Project(Product) Management SW/HW Engineering/Trainer t5online, inc., Seoul, Korea / CEO
- MERITECH Co.,Ltd., Yongin, Korea / SE & Project Manager AstonLinux, Seoul, Korea / Senior Software Engineer & Project Manager

10. PCRM Information

ADVISOR

Korea Blockchain Association
Self-Regulatory Committee
Chairperson

Jeon Ha-jin

- CEO of SiTi Plan
- Former Vice President of Venture Business
- Association Former CEO of HANCOM

Ph.D in Chemistry

Dr. Souli NANTHVONG

- PhD in Chemistry, French National University
- Minister of Environment of Laos
- Office of the Prime Minister of Laos
- Director General of Laos

Ir. Somphone HANOUSITH

- Quebec Agricultural Economics Department in Canada.
- Assistant to the Prime Minister of Laos
- Executive Secretary of the National Science Council

STS&P Executive Chairman

David Yoo

- Chairman of SD Korea Forum
- UNOPS Senior Advisor
- Asia Pacific Peace and Service Alliance Northeast Asia Secretary General

Gyeonggi-do Knowledge Campus leader

Jung Sik Yoon

- Master of Business Administration, University of Houston
- Head of KT CR Headquarters (Vice President), President of OBS Gyeongin TV
- President of MBC Cheongju, Chungju

President

Tae Seok Jang

- PT. Daewoo Logistics Asia
- PT. Hokindo Property Investama
- Dongyang Global Co., Ltd. Indonesia representative

ADVISOR

AHMAD HILYADI

- University of Indonesia (UI) S1 (Business/Finance)
- Establishment of the Sirnagalih Foundation
- Engineering, Power and Oil and Gas Sector Consultants

Sumantri Suwarno

- University of Indonesia (Economics)
- PT. Usahatama Mandiri Nusantara
- PT. Karya Bumi Baratama

President of Korea Automobile Association

Kyung Bae Kim

- Chairman of Korea Automobile Industry Association
- Korea Transport Broadcasting traffic expert
- Representative of Traffic Environment TV Co., Ltd.

President

Sang Joon Lee

- Seoul National University (Law)
- Danong PMC Representative
- Head of International Trading London Branch

Ph.D in Computer Program

Dr. Man Joon Kwon

- Chungnam National University Computer Program Ph.D.
- Professor of Department of Automotive Engineering, Ajou University
- Blockchain Technology Development Advisor at DATAM

Ph.D in Electronics

Dr. Sung Cheol Choi

- Doctor of Electronic Engineering, Ajou University
- Professor of Department of Automotive Engineering, Ajou University
- CRM Device Technology Development Advisor

10. PCRM Information

Legal review

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의 견 서

I. 사안의 개요 및 질의의 요지

귀사의 설명에 의하면, 귀사는 DATAM 코인(이하 "**DATAM**")을 가상화폐거래소에 상장하고자 하고 있습니다.

이러한 상
업에 관한
다.

1. 검토 결론의 요지

DATAM은 한국 자본시장법상 증권에 해당하지 않을 가능성이 높다고 판단됩니다.

DATAM is deemed highly unlikely to fall under the securities category as defined by the Korean Capital Market Act.

II. 검토 의견

1. 검토 결론의 요지

DATAM은 한국 자본시장법상 증권에 해당하지 않을 가능성이 높다고 판단됩니다.

2. 검토내용

가. 검토자료 및 의견의 한계

저희 법무법인은 DATAM의 증권 해당여부 판단을 위해 귀사로부터 아래와 같은 자료를 제공받았습니다.

SDGs 글로벌 블록체인 산업지원 프로젝트
DATAM 코인 White paper(version 1.5)
귀사 홈페이지 기재사항(http://www.data-m.io)

아울러 백서 및 홈페이지의 기재상 불분명한 부분에 대해서 질의를 통해 답변을

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받았으며, 상세한 내용은 아래 검토의 해당 부분에서 언급하였습니다.

저희 법무법인은 귀사가 제공해주신 위 사실관계 및 자료에 기초하여 DATAM이 한국의 자본시장법상 증권에 해당하는지 여부에 관해 의견을 드리며, 제공해주신 사실관계가 변경되거나 추가적인 사실관계가 있는 경우 결론이 달라질 수도 있음을 유의해 주시기 바랍니다.

나. 자본시장법상 증권 관련 규정의 검토

(1) 문제의 소재

주지하시는 바와 같이, 현재 DATAM 과 같은 가상화폐에 관한 별도의 규제 법률은 존재하지 않습니다. 다만 가상화폐를 통한 자금조달 과정에서 가상화폐의 소유자에게 부여되는 권리의 내용에 따라 자본시장법상 증권에 해당할 위험이 있습니다. 이 경우, 즉 소위 증권형 코인(토큰)에 해당할 경우에는 아래와 같은 자본시장법상 증권에 관한 규제가 그대로 적용되게 되므로 주의할 필요가 있습니다.

자본시장법상 증권에 해당하는 경우 이를 50 인 이상에게 청약의 권유를 하고자 하는 자는 사전에 금융위원회(실무는 금융감독원)에 증권신고서를 제출하여야 하며(자본시장법 제 119 조 제 1 항), 금융투자상품의 매매(또는 그 중개), 증권의 발행·인수 또는 그 청약의 권유, 청약, 청약의 승낙을 영업으로 하는 경우에는 투자매매·중개업 인가를 받아야 합니다(자본시장법 제 6 조 제 2 항·제 3 항).[1] 아울러 증권의 매매를 위한 시장을 개설하는 자는 거래소 허가도 받아야 합니다(자본시장법 제 373 조).[2]

따라서 만일 DATAM 이 자본시장법상 증권에 해당하는 경우 귀사는 금융감독원에 증권신고서를 제출하여야 하고, DATAM 을 상장시키는 거래소는 거래소 허가를 받아야 할 것입니다. 그런데 DATAM 과 같은 가상화폐에 관해 금융

[1] 만일 인가를 받지 아니하고 금융투자업(투자매매·중개업)을 하는 경우에는 5년 이하의 징역 또는 2억원 이하의 벌금에 처합니다(자본시장법 제444조 제1호, 제11조, 제6조 제1항).
[2] 만일 허가를 받지 아니하고 거래소를 개설하는 경우에는 5년 이하의 징역 또는 2억원 이하의 벌금에 처합니다(자본시장법 제444조 제27호, 제373조)

Lee & Ko

감독원이 증권신고서를 수리해준 전례가 없고, 현재 한국에서 거래소 허가를 받은 곳은 한국거래소뿐이므로, 귀사가 DATAM을 가상화폐거래소에 상장하기 위해서는 DATAM이 증권에 해당하는지 여부에 관해 검토할 필요가 있습니다.

(2) 자본시장법상 증권의 요건

자본시장법상 증권으로 인정되기 위해서는 금융투자상품이면서 추가지급의무가 없어야 합니다(자본시장법 제4조 제1항). 금융투자상품은 "이익을 얻거나 손실을 회피할 목적으로 현재 또는 장래의 특정(特定) 시점에 금전, 그 밖의 재산적 가치가 있는 것(이하 "금전등"이라 한다)을 지급하기로 약정함으로써 취득하는 권리로서, 그 권리를 취득하기 위하여 지급하였거나 지급하여야 할 금전 등의 총액(판매수수료 등 대통령령으로 정하는 금액을 제외한다)이 그 권리로부터 회수하였거나 회수할 수 있는 금전 등의 총액(해지수수료 등 대통령령으로 정하는 금액을 포함한다)을 초과하게 될 위험(이하 "투자성"이라 한다)이 있는 것" 을 의미합니다(자본시장법 제3조).

즉 자본시장법상 증권은 (i) 이익을 얻거나 손실을 회피할 목적, (ii) 현재 또는 장래의 특정 시점에 금전 등을 지급하거나 지급하기로 약정하고 취득하는 권리, (iii) 투자성(원본손실가능성), (vi) 추가지급의무의 부존재의 모든 요건을 충족하여야 합니다. 특히 DATAM 과 같은 암호화폐는 추가지급의무가 존재하지 않지만,[3] 투자자들은 이익을 얻거나 손실을 회피할 목적으로 DATAM 을 구매하는 경우도 존재한다는 점에서, 그 증권성은 '투자성이 존재하는 재산적 권리가 암호화폐에 화체되어 있는지'를 주로 살펴야 하고, 이는 DATAM 의 소유자에게 어떠한 권리가 존재하는지를 중심으로 검토할 필요가 있습니다.

한편 자본시장법은 금융투자상품을 증권과 파생상품으로 '구분'하고 있고(자본시장법 제3조 제2항), 증권을 다시 아래와 같이 6개의 증권으로 '구분'하고 있습니다. 아울러 자본시장법은 각각의 증권에 대해서 아래와 같이 별도의 정의규정을 두고 있습니다(자본시장법 제4조 제2항부터 제8항).

1. 채무증권 : 국채증권, 지방채증권, 특수채증권(법률에 의하여 직접 설립된

[3] 따라서 파생상품성은 통상 문제되지 않습니다.

10. PCRM Information

법률검토

Lee & Ko

법인이 발행한 채권을 말한다. 이하 같다), 사채권(「상법」 제 469 조제 2 항제 3 호에 따른 사채의 경우에는 제 7 항제 1 호에 해당하는 것으로 한정한다. 이하 같다), 기업어음증권(기업이 사업에 필요한 자금을 조달하기 위하여 발행한 약속어음으로서 대통령령으로 정하는 요건을 갖춘 것을 말한다. 이하 같다), 그 밖에 이와 유사(類似)한 것으로서 지급청구권이 표시된 것

2. 지분증권 : 주권, 신주인수권이 표시된 것, 법률에 의하여 직접 설립된 법인이 발행한 출자증권, 「상법」에 따른 합자회사·유한책임회사·유한회사·합자조합·익명조합의 출자지분, 그 밖에 이와 유사한 것으로서 출자지분 또는 출자지분을 취득할 권리가 표시된 것

3. 수익증권 : 제 110 조의 수익증권, 제 189 조의 수익증권, 그 밖에 이와 유사한 것으로서 신탁의 수익권이 표시된 것

4. 투자계약증권 : 특정 투자자가 그 투자자와 타인(다른 투자자를 포함한다. 이하 이 항에서 같다) 간의 공동사업에 금전등을 투자하고 주로 타인이 수행한 공동사업의 결과에 따른 손익을 귀속받는 계약상의 권리가 표시된 것

5. 파생결합증권 : 기초자산의 가격·이자율·지표·단위 또는 이를 기초로 하는 지수 등의 변동과 연계하여 미리 정하여진 방법에 따라 지급하거나 회수하는 금전등이 결정되는 권리가 표시된 것

6. 증권예탁증권 : 제 2 항제 1 호부터 제 5 호까지의 증권을 예탁받은 자가 그 증권이 발행된 국가 외의 국가에서 발행한 것으로서 그 예탁받은 증권에 관련된 권리가 표시된 것

따라서 이론적으로 자본시장법 제 4 조상 증권의 정의에 부합하지만 각 6 개 증권의 정의에 부합하지 않는 경우가 있을 수 있습니다.[4] 그러나 자본시장법상 증권을 6 개의 세부증권으로 '구분'하고 있는 자본시장법 제 4 조 제 2 항 규정의

[4] 6개의 세부 증권 정의는 통상 증권으로 보는 기존의 각 증권의 정의에 기초하여 열거를 하는 방식으로 정의를 하는 반면, 증권의 정의는 증권의 기능적 측면을 규율하여 포괄적으로 규율하고 있으므로 세부 6개의 증권에 해당함에도 증권의 정의에 부합하지 않는 경우는 존재하기 어렵습니다.

Lee & Ko

취지와 투자계약증권의 포괄성[5]을 고려해볼 때, (이견은 존재하나) 자본시장법 제 4 조상 증권의 정의에 부합한다면 더 나아가 세부적인 6 개의 증권의 정의에 부합하는지 여부를 살피지 않고도 증권에 해당하는지를 판단할 수 있다고 사료됩니다. 다만 자본시장법이 '증권'을 6 개로 한정하여 규정하고 있으므로 자본시장법의 규제 대상 증권을 열거하여 명시하고 있다는 점 및 이론상 제 4 조 제 1 항의 증권 개념이 제 4 조 제 2 항부터 제 8 항의 세부적 증권 개념보다 더 넓을 수 있다는 점을 고려한다면, 6 개 세부증권의 유형도 함께 고려할 실익이 있습니다.

다. DATAM의 경우

(1) 자본시장법 제4조 제1항의 '증권' 해당여부

앞서 말씀 드린 바와 같이, 자본시장법 제 4 조 제 1 항의 정의상 증권은 '투자성이 존재하는 재산적 권리가 암호화폐에 화체되어 있는지', 즉 DATAM 의 소유자에게 어떠한 권리가 존재하는지를 중심으로 검토할 필요가 있습니다.

귀사의 설명에 따르면, DATAM 은 다음과 같은 과정을 거쳐 발행(채굴 포함)됩니다. DATAM 은 총 발행량 738,738,738 개 중 ERC-20 기반으로 369,369,369 개가 발행되었으며, (i) 이 중 150,000,000 개는 탄소감축증명을 위한 인프라 구축에 필요한 자금 조달 목적으로 담보로 제공될 예정으로 시장 판매가 불가능하며, (ii) 30,000,000 개는 귀사의 팀과 어드바이저 배분용으로 지급되지만 Main Net 구축 시까지 잠금이 설정되어 판매가 불가능하고, (iii) 나머지 189,369,369 개의 DATAM 이 프라이빗(Private) 거래 또는 코인 거래소 시장에 판매될 예정입니다. DATAM 코인 총 발행량 및 배분량은 귀사의 코인 정책 및 시장 변화 등에 따라 합법적인 절차에 의해 수정 또는 보완될 수 있습니다.

또한 DATAM 의 총 발행량 738,738,738 개 중 Maint Net 블록체인 상에서는 채굴 방식으로 매년 36,936,936.9 개씩, 10 년 간 총 369,369,369 개가 발행될 예정입니다. DATAM 은 PoW(Proof of Work)나 PoS(Proof of Stake)가 아닌

[5] 투자계약증권은 미국의 투자계약(Investment Contract)을 참고하여 도입한 것으로서 다른 5개 증권에 해당하지 않는 새로운 유형의 증권을 포섭하기 위한 것으로 이해되고 있습니다.

법률검토

Lee & Ko

PCR(Proof of Carbon Reduction – 탄소감축증명)을 도입하여, 통상적 경우에 비하여 탄소 배출을 감축하는 행위를 하는 경우 해당 감축량에 비례하여 코인이 채굴되는 CRM(Carbon Reduction Mining – 탄소감축채굴) 시스템에 따라 행위자에게 지급됩니다.

아울러 위와 같이 발행된 DATAM 은 친환경 대중교통 이용에 쓰이는 암호화폐 교통카드(Green Pass Card)를 충전하여 교통요금을 지불하는 수단으로 사용될 예정입니다. 법정화폐를 이용한 교통카드 충전 및 교통요금 지불 역시 가능할 예정이나, DATAM 을 이용한 경우에만 CRM 에 따라 탄소 배출 감축에 따른 DATAM 보상을 받을 수 있기 때문에 DATAM 이 법정화폐에 비해 보상 측면에서 상대적인 장점을 갖습니다. 또한 인프라 구축에 따라 DATAM 의 사용처는 점차 다양해질 수 있습니다.

이상의 내용을 종합해보면, 귀사는 DATAM 의 개발자금을 프라이빗(Private) 거래 또는 코인 거래소 판매로 조달하고자 하며, 향후 CRM 채굴방식에 따라 탄소감축증명(PCR)을 한 자들에게 DATAM 을 추가 발행하여 지급함으로써 보상을 하는 것으로 보입니다. 아울러 DATAM 은 친환경 대중교통 이용에 쓰이는 암호화폐 교환카드(Green Pass Card)를 충전하여 교통요금을 지불하는 수단으로 사용될 수 있습니다.

이는 **법정화폐를 지급하는 대신 DATAM 을 이용하여 충전을 하는 것으로서 귀사가 암호화폐 교환카드(Green Pass Card) 충전에 활용된 DATAM 에 대한 일정한 보상**(예를 들면 교환카드 충전에 활용한 1DATAM 을 1 원으로 보상해 준다는 등)**을 한다는 사정이 없이, 단순히 암호화폐 교환카드 발행자와 충전자 간의 자율적인 계약에 따라 충전이 이뤄지고, DATAM 의 환가는 가상화폐거래소에서의 매매를 통해서만 이뤄진다면,**[6] **특별히 DATAM 자체에 투자성이 있는 일정한 재산적 권리가 화체되어 있다고 보기는 어렵다고 사료됩니다**. 또한 백서나 귀사의 홈페이지의 기재사항, 귀사의 설명상 그 외에 DATAM 보유자에게 인정되는 다른 투자성이 있는 재산적 권리[7]가 있다는 사정은 보이지

[6] 구체적인 암호화폐 교환카드 충전 및 활용 방식에 대해서는 백서나 홈페이지 기재 등 여타의 자료상 구체적인 내용을 찾을 수 없는 바, 향후 사업 추진 과정에서 증권에 해당할 가능성이 있는 요소에 주의하시면서 사업을 추진하시는 것이 바람직하다고 사료됩니다.

[7] 예를 들면, DATAM 보유 자체로서 추가적인 DATAM을 지급받거나 기타 금전적 가치가 있는 보상을 수령할 권리가 존재하는 경우, 귀사 또는 DATAM과 관련한 회사·재단 등의 의사결정에 참여하거나 의결권

Lee & Ko

않습니다.[8]

따라서 앞서 말씀 드린 바와 같이 **DATAM 의 환가나 그 소유에 대한 보상이 가상화폐거래소에서의 매매를 통해서만 이뤄지는 경우에 DATAM 은 자본시장법상 증권에 해당하지 않을 가능성이 높다고 판단**됩니다.

(2) 세부 증권 분류 해당여부

앞서 말씀 드린 바와 같이 자본시장법상 증권 해당여부는 제 4 조 제 1 항에 따른 증권성 검토로 족하다고 판단되나, 세부 증권 분류에 해당하는지 여부를 검토할 실익은 있고, DATAM 코인이 아닌 본건 구조 자체가 증권성이 있는지 여부는 주로 투자계약증권의 해당여부에서 문제가 되므로 이에 관해 검토하겠습니다.

우선 **채무증권**의 경우 회사채와 같이 일정한 지급을 청구할 수 있는 권리가 존재해야 하고, **지분증권**의 경우 주식과 같이 이익 배당이나 잔여재산 분배, 의결에 참여할 권리 등이 존재해야 합니다. 그러나 앞서 말씀드린 바와 같이 DATAM 에는 이러한 권리가 존재한다고 보기 어렵습니다.

또한 **수익증권**은 신탁의 수익권이 표시된 것이고, **파생결합증권**은 기초자산의 변동과 연계하여 미리 정해진 방법에 따른 금전 등을 지급받는 권리가 표시된 것이며, **증권예탁증권**은 증권을 예탁 받은 자가 발행하는 것이므로 DATAM 이 위와 같은 증권에 해당할 가능성은 낮다고 사료됩니다.

투자계약증권의 경우도 DATAM 자체에 화체된 권리를 기준으로 본다면, 타인이 수행한 공동사업의 결과에 따른 손익을 귀속 받는 '계약상의 권리'가 존재한다고 보기 어려우므로, DATAM 이 투자계약증권에 해당한다고 보기도 어렵습니다.

을 행사, 또는 이익이나 잔여재산을 분배 받을 권리가 존재하는 경우 등

[8] 다만 앞서 말씀드린 바와 같이 사실관계가 수정되거나 추가적인 사실관계가 존재하는 경우 결론이 달라질 수 있고, 특히 DATAM 이 향후 개발 단계에서 그 용도가 확장되면서 증권에 해당할 개연성이 있으므로 주의할 필요가 있습니다.

법률검토

Lee & Ko

이상과 같이 DATAM 코인은 자본시장법 제 4 조 제 2 항부터 제 8 항 소정의 세 부증권분류상의 증권에 해당한다고 보기도 어렵습니다.

이상의 내용을 귀사의 업무에 참고하시기 바랍니다. 끝

10. PCRM Information

Milestone of PCRM

2023
- 글로벌 탄소감축 수송수단 전환 리젠 파워트레인 생산 및 공급
- 친환경, 저탄소 비즈니스 융합 및 통합 탄소감축증영 WEB 3.0 플랫폼 출시

2022
- 2022 인도네시아 발리 G20 사이트이벤트 참여
- 글로벌 탄소감축 수송수단 전환 및 재제조 사업 추진 (베트남, 인도네시아, 필리핀 등)
- 전기오토바이 재제조 시작품 제작 및 테스트 완료
- 2022 대한민국 유망 특허기술 대상 – 탄소감축 신기술 부분

2021
- 전기 오토바이 REGEN Technology® 개발 완료
- 신재생에너지 해상풍력발전사업 추진
- 2021 대한민국 유망 특허기술 대상 – 블록체인 신기술 부분

2020
- 스마트기술 UN 조달 전시 컨퍼런스(STS&P) 행사주관
- SDM(CDM)기반 스마트시티 사업개발
- 재생 중유(CNSL) 신기술 개발
- 농업분야 탄소감축 스마트팜 기술 개발

2019
- 라오스 및 베트남 정부 데이탐 프로젝트 협약 체결
- CTCN 등록 (UN 4대 기후기술기구)

2018
- 탄소감축증명 블록체인 개발
- UNFCCC 지원 기후체인연합 회원사(CCC) 등록

2017~
- 자동차 기반의 빅데이터 특허등록
- Hypermiling 초과주행 기술 개발 완료 (iEDS)
- 차량 SDM(CDM) 프로젝트 공동 사업 협약 (스위스 Grutter 컨설팅)

10. PCRM Information

ROADMAP

2024~

- **Operation of local REGEN reassembly factories in Southeast Asia.**
- **Implementation of global carbon offset verification services.**
- **Commencement of substantial revenue generation and acquisition of carbon emission rights.**

2023 (4Q)

4Q

- Launch of REGENLIFE service.
- Pilot service of carbon offset verification for delivery platform in Indonesia.
- Establishment of basic operating guidelines for Carbon Market.

2023 (3Q)

3Q

- Launch of REGENDRIVE service (until 4Q).
- Launch of REGENPUB service.
- Launch of XTE partnership service.

2023 (1Q~2Q)

1Q~2Q

- In progress of establishing an electric motorcycle manufacturing factory in Vietnam.
- CDM registration of regen technology.
- Progressing with electric taxi business in Laos.
- Progressing with E-BUS pilot project in Vietnam.

2022

1Q~4Q

- Completed construction of the carbon reduction data server.
- Ongoing transfer of regen technology (Vietnam).
- In progress of constructing key production facilities utilizing CNSL (Vietnam).
- Launched electric motorcycles with a single charge range of 300km.
- Targeting listing on major cryptocurrency exchanges.
- Planning for listing on overseas exchanges (1-2 exchanges).
- Completed legal and security assessments.
- Completed certification and evaluation of virtual assets.
- Conducted token transfer tests and token swaps.
- Participated in conferences and made public presentations on PCR blockchain.
- Successfully completed final verification tests for carbon reduction certification.

PCRM
Whitepaper

THANK YOU!