A PLATFORM OF REWARDING SYSTEM FOR CARBON EMISSION REDUCTIONS USING CRYPTOCURRENCY EDELCOIN
INTRODUCTION
An additional function has been added to EDEL blockchain to improve on issues found in previous blockchain models. POW (Proof of Work) method used in previous blockchain models led to excessive mining competition and energy consumption, and POS (Proof of Stake) method which was introduced as its alternative did not require mining, however, it faces difficulty in inflow and increase of new users.

To correct these issues, a new mining method referred to as Carbon Reduction Mining (CRM) and a respective reward system has been made in EDEL blockchain. CRM conserves energy, rather than it consumes energy. Proof of Carbon Reduction (PCR) is a system that rewards users for conserving energy using CRM and is a method of providing users with compensation proportional to the carbon emissions reduced by CRM and demonstrated by PCR.

This paper aims to explain how CRM/PCR methods conserve energy; how CRM/PCR methods reward efforts in reducing carbon emissions; the principles and structures of CRM/PCR; and their value and vision.
CONTENTS
## INTRODUCTION

## CONTENTs

### PROBLEMs
- Fossil Fuels and Production of Green house Gases ........................................ 7
- An Overview of the CDM Business and its Problems ..................................... 8
- The Intention and Problems of Eco-Drive ...................................................... 10
- Problems with Cryptocurrency and Pow Mining .......................................... 10
- Problems with Alternative Consensus Algorithms ....................................... 11

### SOLUTIONs
- EDEL Coin and CRM ....................................................................................... 15
- CRM and Eco-Drive ......................................................................................... 16
- The compensation system of CRM and PCR ................................................. 19
- The Expansion of CRM and PCR .................................................................. 22
- The Value and Vision of EDEL Coin .............................................................. 30

## OUR BLOCKCHAIN

## REFERENCES

## ROADMAP

## ICO PLAN

## PATENTs

## OUR TEAM

## APPENDIX

edelcoin.io
PROBLEMS
Fossil Fuels and GHG Emissions

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hough the usage of fossil fuel has brought about general material wealth through industrialization since the Industrial Revolution, it has also caused severe environmental damage. Fossil fuel usage has been internationally criticized for causing air pollution, acid rain, and global warming. Global greenhouse gas (GHG) emissions was measured at 53.4 Gtons of CO2 in 2016, with 35.8 Gtons produced by human activities.¹

The most effective solution to steadily increasing CO2 emissions is the reduction of energy consumption. There are several technical approaches to this solution; the first is to increase fossil fuel energy efficiency, and the second is using renewable energy, and the third is recycling CO2.¹¹

Source: https://doi.org/10.5194/essd-2017-79
An Overview of the CDM Business and its Problems

Fossil fuel usage and its negative effects on the environment have been continuously criticized globally, and solutions have been sought. The Paris Agreement negotiated at the COP 21 UNFCCC and POST-2020 based on the agreement is expected to bring many changes to the transportation industry.iii The International Transport Forum (ITF) predicts an expansion of the role of public transportation and increase in supply of eco-friendly vehicles (electric and hydrogen-powered vehicles) under POST 2020.iv According to this report private vehicles account for 50 percent of the city’s greenhouse gas emissions, and because this trend will continue due to the convenience of door-to-door capabilities, policies that shift private cars to shared cars and public transportations are needed. The report describes that a study found an emphasis on the car sharing industry, cab-sharing industry, and cab-pooling will not only reduce greenhouse gas emissions, but also improve car density on the road, increase parking space, and effectively expand sidewalks and bicycle roads.
Moreover, to lead an efficient transport system against long-term low carbon policy, an efficient and sustainable transportation infrastructure needs to be taken into account together with the latest technology elements such as ICT (Information & Communication Technology) convergence, Big Data and self-driving cars. In addition, the transportation industry must act on market-based greenhouse gas reduction mechanisms such as emissions trading, which currently allows emissions trading for air transport. Emissions trading or other market-based greenhouse gas reduction mechanisms for road transport should also be considered, as road transport takes a large proportion of emissions.

POST-2020, which replaces the Kyoto Protocol that placed the responsibility of emissions reductions exclusively on developed countries, requires all underdeveloped and developing countries to reach their goals in reducing emissions. However, the fact is that it is also tricky for the developed countries to solve this problem as well.
The purpose and problems of Eco-Drive

Traffic and transportation are the major areas where fossil fuels are used and CO2 emissions are high. Among them automobiles in the road transport take up the largest proportion. Approximately 25.7% of greenhouse gas emissions caused by fossil fuels are attributed to transportation, especially those serviced by petroleum-based fuels such as gasoline and diesel. Emissions by passenger cars, buses, trucks, and motorcycles take up approximately 60% (5.6 Gton CO2) of emissions in transportation section and that is about 15.9% of the whole. vii

Reduction of emissions by transportation requires development and supply of eco-friendly vehicles such as electric or hydrogen cars, but feasible measures are needed until such vehicles can be commercialized. While increasing fuel efficiency by improving engine capacity and aerodynamics are the possibilities, Eco-drive is a practical option for individuals. viii

We can record enhanced fuel efficiency compared to official fuel efficiency depending on how the driver operates the car, but usually we call this kind of operation eco-friendly economical operation, or Eco-Drive. ix This means reducing fuel consumption and CO2 emissions by improving the way, habit, or manner of running transportations. Also, it was verified that this Eco-Drive not only saves energy and reduces CO2 emissions, but also has positive by-effect in stability perspective such as reduction of traffic accidents by controlling impractical over speed driving x.
As the effects and importance of Eco-Drive stand out, a variety of promotion and activation methods in order to supply and activate Eco-Drive are being studied and diverse campaigns were carried out, but Eco-Drive is still not popularly known to the public yet.\textsuperscript{xi}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{ecodrive.png}
\caption{Eco driving flowchart}
\end{figure}

\begin{center}
\textbf{Problems with Cryptocurrency and POW Mining}
\end{center}

As encrypted currency based on blockchain emerged recently, excessive energy consumption of mining to maintain blockchain is gradually standing out as a social issue, and this phenomenon is becoming more serious as time passes and POW (Proof of Work) method that is represented by bit coin can not avoid this problem.\textsuperscript{xii, xiii}

POW method is problematic in that the difficulty of mining rises as the mining competition rises, and the price of the mine increases as well as the specifications and price of mining facilities. As a result, hash power is concentrated on several certain specialized mining companies and this unproductive overdrive of energy and mining in violation of decentralization are pointed out as major drawbacks of POW.

\textsuperscript{xii, xiii}
Problems of the alternative, consensus algorithm

POS (Proof of Stake) method is the alternative that appeared after these problems of POW method were recognized and many other various attempts were made to solve them. POS method succeeded in getting rid of unnecessary spec competition and energy waste by throwing away energy consuming mining and introducing noncompetitive consensus algorithm, but it still had weakness of vulnerability in securing many participants due to the features of algorithm.
For the block chain network to be healthy, it requires a large number of participants because attacking the network gets more difficult when more nodes are involved. POW method continuously gives opportunity for a new participant to take part in blockchain by giving compensation whenever new blocks are created. However, the number of participants with coins is important because the POS method rewards only existing players based on their shares without mining. But the problem is that there is no proper method to increase the number of people. Since the only way of giving users ownership of POS coins is purchasing through an exchange other than allowing users to participate in early coin distribution through ICO, it contradicts the fundamental principle of blockchain that aims for decentralization, and can lead to monopoly of large capital and polarization of wealth.

Blockchain that selected POS method is suggesting its own method to start the service after recruiting participants as much as possible by starting off with POW and converting to POS several years later as Ethereum did, or like EOS which proceeded ICO (Initial Coin Offering) for a long time, almost a year, in order to solve this kind of initial coin circulation issue, but these circuitous methods can not be complete solutions for the problem of POS method.

<table>
<thead>
<tr>
<th>Period</th>
<th>No. of EOS Tokens Distributable</th>
<th>Duration</th>
<th>Open</th>
<th>Close</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>200,000,000 (two hundred million)</td>
<td>120 hours (5 days)</td>
<td>June 26, 2017 13:00:00 UTC</td>
<td>July 1, 2017 12:59:59 UTC</td>
</tr>
<tr>
<td>1</td>
<td>2,000,000 (two million)</td>
<td>23 hours</td>
<td>July 1, 2017 13:00:00 UTC</td>
<td>July 2, 2017 11:59:59 UTC</td>
</tr>
<tr>
<td>2</td>
<td>2,000,000 (two million)</td>
<td>23 hours</td>
<td>July 2, 2017 12:00:00 UTC</td>
<td>July 3, 2017 10:59:59 UTC</td>
</tr>
<tr>
<td>3</td>
<td>2,000,000 (two million)</td>
<td>23 hours</td>
<td>July 3, 2017 11:00:00 UTC</td>
<td>July 4, 2017 09:59:59 UTC</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>350</td>
<td>2,000,000 (two million)</td>
<td>23 hours</td>
<td>June 1, 2018 00:00:00 UTC</td>
<td>June 1, 2018 22:59:59 UTC</td>
</tr>
</tbody>
</table>

Source: [https://eos.io/instructions](https://eos.io/instructions)
SOLUTIONs
EDEL Coin and CRM

EDEL is differentiated from the existing block chain network by compiling the advantages of major cryptocurrency in the market and making up for its disadvantages. EDEL’s fundamental network structure allows electronic payment and smart transactions through transaction and virtual machines. The POS method is used by EDEL to maintain this network and eliminate excessive competition and energy wastage using consensus algorithms to create new blocks or maintain the blockchain system. Additionally, EDEL uses a new mining method and reward system to correct its disadvantages. The new mining method, also known as CRM (Carbon Reduction Mining) conserves, rather than consumes, energy.

EDEL uses the POS method with a basic consensus algorithm, meaning that the distribution of early cryptocurrency occurs through ICO during preselling and limited periods of time. In order to steadily increase coin owners and provide opportunities to participate in the blockchain, CRM is encouraged and new coins are produced and supplied as compensation for CRM. In order for a user to receive this compensation, he/she must provide proof of carbon reduction.

Proof of carbon reduction by CRM firstly requires the user to consume less carbon than the given baseline standard. The baseline must be reasonable and objective in order to accurately measure how much carbon has been reduced. For example, if shared costs or big data are formed, it is possible to set an objective baseline for the relevant car model, and Eco-Drive can measure and compare the amount of fuel conserved.

If fuel is conserved according to comparisons of resources and energy, it is possible to quantify the conserved amount and hence, calculate reduced carbon emissions. This process is referred to as PCR (Proof of Carbon Reduction), and compensation can be offered based on the quantified carbon reduction rates as exhibited by PCR. Compensation is offered in EDEL, and for this, PCR reward system is created in EDEL blockchain.
Carbon reduction mining and Eco-Drive

Eco-Drive is one example of carbon reduction mining. When driving a car, the driver can implement Eco-Drive to save fuel. So it can realize a series of procedure on EDEL blockchain platform that receives certain ratio of EDEL encrypted currency for reward as it measures the amount of fuel that is actually reduced by providing and utilizing the method to exactly measure the effect of Eco-Drive when implementing the technology, and then converts the measured amount of reduced fuel to reduced CO2.

There are these following devices and methods to measure the effect of Eco-Drive.

- **Fuel injection signal detector**
  During motoring time, it measures the fuel injection amount and fuel consumption amount by detecting the car's fuel injection signal in micro motion unit, about a thousandth, calculates travel range by using GPS device, and then calculates average fuel efficiency by calculating the ratio of fuel consumption amount to that travel range.

- **OBD-II connector**
  It's a device that calculates average fuel efficiency by measuring consumed amount of fuel and travel distance as it detects particular PID (Parameter ID) value by connecting vehicle to its OBD-II (On-Board Diagnostics) socket while the vehicle is being operated.

- **Other fuel efficiency calculating devices an methods**
  It's a way of using measurement formula that can measure running vehicle's fuel consumption and computing algorithm by using basic information of the vehicle and GPS information.xvi
  In this regard, primary information is basic vehicle information and GPS information, and secondary information is the information that
can be obtained by using primary information. Also, tertiary information is the information that can be obtained by using both primary and secondary information. By using these methods, we can measure the vehicle’s fuel consumption, fuel efficiency, and the CO2 emissions in smartphone app form with GPS technology.

<table>
<thead>
<tr>
<th>1st Information</th>
<th>2nd Information</th>
<th>3rd Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPS Data</td>
<td>Vehicle Speed (Km/h)</td>
<td>Acceleration (km/sec^2)</td>
</tr>
<tr>
<td>Vehicle Data</td>
<td>Driving Distance (km)</td>
<td>Quick Start / Rapid acceleration</td>
</tr>
<tr>
<td></td>
<td>Driving Duration</td>
<td>Rapid Break / Idling</td>
</tr>
<tr>
<td></td>
<td>Driving Route</td>
<td>Fuel Consumption (liter)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fuel Efficiency (Real-time / Average)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CO2 Emissions (kg)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fuel-cut</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fuel-cut Duration</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fuel-cut Distance</td>
</tr>
</tbody>
</table>

When we measure average fuel efficiency of vehicle operation that implement Eco-Drive with this kind of device and method, we can know how much the vehicle reduced fuel consumption compared to the official fuel efficiency, and we can say that CO2 emissions were reduced as much as the reduced amount of fuel consumption. The reduced amount of CO2 emissions can be calculated from the amount of fuel by a simple formula as below, and the conversion factor that is used on this occasion changes according to the type of fuel.xvii

\[
\text{CO2 emission (kg)} = \text{conversion factor (CO2 emission per 1L of fuel)} \times \text{fuel consumption} \quad \text{.................................} \quad \text{(Eq. 1)}
\]

For example, using the following table and various nations’ reports, approximately 2.31Kg of CO2 is created from combusting 1L of gasoline. Therefore, the conversion factor of gasoline is 2.31Kg/L.xviii
The next section explains how Eco-Drive conserves fuel consumed by cars, and how the amount conserved can be converted to quantifiable units, sent to EDEL’s blockchain, and used to offer compensation.
The reward system of CRM and PCR

Eco-Drive carbon reduction mining and reward in accordance with this are done through the following process.

① CRM is a device that allows carbon reduced mining, and it can be installed within Eco Drive’s measuring device, as the two devices must work in unison.

② Carbon reduction mining device has to be registered in EDEL blockchain network, and the initial user gets to have the ownership of Carbon reduction mining device on this occasion.

③ A properly registered CRM device will send carbon data including vehicle driving information recorded by Eco-Drive to the EDEL blockchain network.

④ EDEL’s blockchain network assesses and verifies carbon data sent from the CRM device. This process includes confirmation of the correct registration, validity, and status of the CRM device, comparison with baseline data, and assessment.
5 When the carbon data is verified, EDEL’s blockchain network computes carbon reduction data and calculates EDEL cryptocurrency to be rewarded using a given ratio. The ratio can take into account carbon trading rates and EDEL’s market value.

6 EDEL’s blockchain network issues new EDEL currency to users as reward for carbon reduction data.

7 The ownership of a CRM device can only occur with explicit consent of the previous owner. The shift in ownership is recorded on the device.

All of these procedures are recorded in EDEL blockchain system, so counterfeit or falsification of data is impossible, and anyone can check the saved data so the reliability and transparency of data are guaranteed.

Also, if a majority of users get to obtain and hold EDEL encrypted currency through this carbon reduction mining and rewarding system, the right and reward of miners will disperse, thus making EDEL blockchain healthier and accordingly the weakness of POS method will naturally be solved.
As a majority of users take part in blockchain and obtain coins, blockchain becomes a safer system and the value of coins increases, and this leads to participation of more users. This circulation is a phenomenon which was also seen from recent bit coin. The increase of value brings more participation of miners, and thus, the value of coins increases accordingly.

While resources and energy are more consumed as the competition among miners becomes severe in bit coin mining, energy is saved and carbon is reduced as the competition becomes severe in EDEL carbon reduction mining. Therefore, we can say that the rise of coin value and intensifying competition structure of mining in EDEL system are a desirable virtuous cycle procedure.

Like this, we can say that giving moral and positive motivation to miners and making them to implement carbon reduction mining more actively by providing them with a new mining method that saves energy are the merits of carbon reduction mining and its rewarding system.
The Expansion of CRM and PCR

Carbon reduction mining can be applied to not only Eco-Drive, but also to all energy saving actions, activities, devices and systems that can reduce CO2 emissions.

For example, if a user reduced the usual amount of power and expense through private sunlight generation, the reduced amount can be recognized as a carbon reduction mining through a series of authentication procedure. In this case, the user can receive double benefits, one benefit from the reduced expense and the other from EDEL encrypted currency compensated for reducing energy, and the user can also expect expectation profit followed by rise in EDEL encrypted currency's value in the future.

In this way, it can make a PCR reward system for the reduced CO2 by evaluating and digitizing the utility of pollution-free power plant facility or device such as sunlight, wind power, and tidal power.

But it has to satisfy the precondition that there has to be a reasonable and objective baseline when constructing this new compensation system. It's because the accurate amount of carbon reduction can be measured and this can be compensated only when the baseline exists.

In case of pollution-free power plant facility mentioned above, the amount of CO2 emitted during thermal power generation using fossil fuels in order to generate electricity can be the baseline.

Also, in the case of electric cars or motorcycles, the amount of CO2 that occurs when driving with fossil fuels can be the baseline. But in this case, the precise amount of reduction can be calculated when considering the amount of CO2 that is emitted to produce electricity needed to drive the distance.
Like this, EDEL reward system can be applied to all existing or future energy saving businesses and projects, and this means that EDEL reward system can contribute to activation of those businesses or projects in certain ways.

Examples of broad applications of the CRM and PCR reward system are as follows.

**[Application 1] ECO Driving with Traditional Vehicles**

1. A CRM Device is installed on a fossil fuel-powered vehicle. Here, fossil fuels include gasoline, diesel, Liquefied Natural Gas (LNG), and Liquefied Petroleum Gas (LPG)

2. Carbon Reduction Data includes
   - Information computed with vehicle driving information including mileage, fuel consumption, and fuel efficiency
   - Baseline fuel efficiency
   - Quantity of fuel conserved and respective quantity of carbon emission reduced according to baseline and vehicle driving information

3. Quantity of fuel conserved is equivalent to the difference between the baseline fuel consumption rate and actual fuel consumption rate when driving the vehicle a given distance. For example, if the baseline fuel consumption rate for a gasoline vehicle is assumed to be at 12.2 km/L, actual fuel consumption rate is at 15km/L, and distance is 100km, quantity of fuel conserved and quantity of carbon reduced is calculated as follows.
   - Baseline quantity of fuel consumed = 100 km x 1/12.2 L/km = 8.2 L

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1 Baseline fuel consumption rate can be fuel consumption rate as measured by the vehicle manufacturing firm or any reasonable rate.
- Actual quantity of fuel consumed = 100 km x 1/15 L/km = 6.7 L
- Quantity of fuel conserved = 8.2L - 6.7L = 1.5 L
- Quantity of carbon reduced can be calculated as a proportion of quantity of fuel conserved.
- According to Eq. 1, [ quantity of CO2 emission reduced ]
  = [ conversion factor ] x [ quantity of fuel conserved ]
- Conversion factor refers to CO2 emitted per 1L of fuel. the conversion factor of gasoline is approximately 2.31 Kg/L.
- Therefore, according to the above formulae, the quantity of CO2 emissions reduced is 3.465 Kg.

4. Carbon emissions data is transferred to the EDEL blockchain actual fuel consumption rate is calculated to be higher than the baseline fuel consumption rate at the end of a driving session.

5. After the block chain identifies the transferred carbon abatement data, EDEL coins are issued in proportion to the amount of carbon reduced and are paid to the owner of the CRM device.

[Application 2] Driving with Eco Friendly Vehicles

1. A CRM Device is installed on an eco-friendly vehicle (electric or hydrogen-powered)

2. Carbon Reduction Data includes
   - Mileage computed with vehicle driving information
   - Baseline carbon emissions of fossil fuel vehicles
   - Carbon reductions of eco-friendly vehicles calculated using baseline

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2 Vehicles include both 4-wheeled and 2-wheeled vehicles. Hence, vehicles include motorcycles.
3 The baseline consumption rate must be calculated with a fossil fuel-powered vehicle that is most equivalent to the eco-friendly vehicle in question
3. The following are examples of carbon reduction calculations when driving an eco-friendly vehicle for 100 km.
   - First, if the baseline carbon emissions for a gasoline vehicle is assumed to be at 15 km/L, and distance is 100km, quantity of carbon reduced is calculated as follows.
     Carbon emissions baseline = 100 km x 1/15 L/km x 2.31 Kg/L = 15.4 Kg
   - Calculate the electricity consumed when an eco-friendly vehicle drives at this distance, then subtract the carbon emissions from the carbon emissions baseline when producing the calculated electricity quantity. The carbon produced when producing 1 kWh of electricity depends on the type of energy\textsuperscript{xix} but is currently expected to average about 0.515 Kg / kWh and to fall to 0.335 Kg / kWh in 2040.\textsuperscript{xx}
   - If the carbon emissions from the production process of the motor(battery included) of electric vehicle and the hydrogen oxidation reactor of hydrogen-powered vehicle are greater than the carbon emissions from the fossil fuel-powered engine production process, they should be subtracted from the carbon emissions reduced by the eco-friendly vehicle.
   - Reduced carbon emissions from eco-friendly vehicles can be estimated at about 80% of the carbon emissions of the baseline reference vehicle.

4. Carbon reduction data is delivered to the block chain by the CRM device.

5. After the block chain identifies the transferred carbon abatement data, Edelcoins are issued in proportion to the amount of carbon reduced and are paid to the owner of the CRM device.
[Application 3] Eco Friendly Power Generation

1. A CRM Device is installed onto an eco-friendly power generator (solar, tidal, wind etc.).

2. Carbon Reduction Data includes
   - Actual power generated
   - Baseline carbon emitted in generating actual power generated by a fossil fuel-powered generator
   - Quantity of carbon reduced by eco-friendly power generator based on baseline carbon emitted

3. Actual power generated by the eco-friendly power generator is based on internal records. In addition, a baseline carbon emissions standard is assumed to calculate carbon reduced by an eco-friendly power plant.
   - For example, the quantity of carbon reduced when an eco-friendly generator produces 100kWh of energy is equivalent to the quantity of carbon produced by a fossil fuel-powered generator when producing that same amount of energy.
   - In cases where quantity of carbon emitted during the construction of the eco-friendly generator is larger than that emitted during the construction of a fossil fuel powered generator, some amount may be subtracted from quantity of carbon conserved.
   - Hence, quantity of carbon emission reduced with an eco-friendly power generator can be calculated to be approximately 80% of carbon emission produced by a fossil fuel-powered generator.

4. Once the environmentally friendly power plant has been in operation for some time, the carbon reduction data is delivered to the block chain by the CRM device.

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4 Power-generators are not limited to large-scale plants but can also include small-scale home generators.

5 If operation is continuous, a time interval (daily, weekly etc.) is used for assessment.
5. Once the block chain identifies the transferred carbon abatement data, EDEL coins are issued in proportion to the amount of carbon reduced and are paid to the owner of the CRM device.

[Application 4] Eco Friendly Public Transportation

1. A CRM Device is installed on an eco-friendly public transportation vehicle

2. Compensation in the form of discounts to passengers who pay their fee with cryptocurrency

3. Carbon Reduction Data
   - Distance traveled with eco-friendly public transportation
   - Carbon emitted when equivalent fossil fuel powered public transportation vehicle travels the same distance
   - Carbon reductions of eco-friendly public transportation calculated using baseline
   - Owner and passenger information

4. When the passenger uses an electric-powered taxi, the user’s wallet can interact with the payment device and the payment can be made with cryptocurrency.

5. In an ordinary situation, a fee of 100 coins can be paid by passenger A to driver B and this transaction is recorded on a block as follows.

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6 Electric taxi, electric bus, rental electric vehicles etc
6. However, when the reward system is applied, driver B is rewarded for operating an eco-friendly public transportation system with (for example) 2 coins, and receives 98 coins from the passenger. In this case, the driver has earned 100 coins for operating an eco-friendly taxi, which is the same amount of money he would have earned with a normal taxi. On the other hand, passenger A paid 98 coins, which is 2 coins less than the taxi fare taking the reward for carbon reduction into account. Therefore, the reward for carbon emissions is given all to the passenger.

```
Tx3.x   User A pays 100 coins to taxi driver B

Tx3.x+1 User A pays 98 coins to taxi driver B
```

7. Another discount method can be applied. Driver B can receive 2 coins for carbon reduction as in the above example. Taxi driver B gets 99 coins from user A for his taxi fare which is less discounted than crypto currency of carbon emission reductions. In this case, the taxi driver receives 101 coins, which is a larger amount of money than the taxi fare. Meanwhile, the passenger paid 99 coins, which is a smaller amount of money than the actual taxi fare. As a result, the reward of 2 coins is distributed 1 each to both the driver and the passenger.

```
Tx3.x   System transfer 2 coins to taxi driver B (miner)
Tx3.x+1 User A pays 98 coins to taxi driver B
```
8. When this method is applied as a rewarding system for eco-friendly public transportation, it will benefit both the passenger and owner of the transportation vehicle. Hence, this method can be used as a way to encourage users to prefer and select eco-friendly modes of transportation.
Value and vision of EDEL encrypted currency

At this point of blockchain and encrypted currency making headline, most optimists predict that participants of encrypted currency economy will make exponential growth because in the case of cryptocurrency utilizing block chain technology, anyone can create wallet and take part in trade only if they have access to Internet. But the reality is that even bit coin which is the initial encrypted currency that has existed for the longest time is held by just over 20 million people in the world, and this is only about 0.3% of the world's population.

In this situation, if Eco-Drive carbon reduction mining and compensation system are applied to about 1.3 billion vehicles in the world, it is also expected how many users will hold EDEL encrypted currency and take part in EDEL blockchain.

The percentage of traffic and transportation field in global CO2 emissions is about 27 %, and the percentage of passenger cars is about 16 %. If Eco-Drive is implemented in vehicle operation globally, there will be about 0.5 ~ 1.0 % reduction effect on global CO2 emissions. This is a very meaningful figure, but until now the practice of eco-drive worldwide has been a non realistic story. However, if EDEL Coins' CRM carbon reduction mining and PCR compensation system are activated, it will no longer be impossible.
Most energy saving projects like Eco-drive are led by the government or non-profit organizations, but there is a limit in giving full support in carrying them forward with tax or donation fund. As an example, the government or local government gives subsidy to an individual when he/she installs sunlight power plant, purchases electric car or etc., and when EDEL compensation system works even in this case, it will be helpful to supply, vitalization, and popularization of the project.

EDEL’s carbon reduction mining and compensation system can be applied to even areas that could not be handled in existing CDM business or carbon trade markets, and they can also reward individual’s energy saving efforts which was impossible in the past. Even if the reduced amount of each individual is not big, it will be much more meaningful if we can gather efforts of numerous users. Thus, expansion and application of carbon reduction mining and compensation system in various fields will act as a motive power that activates more CO2 reduction activities, and CO2 emissions will decrease proportionally, which will ultimately contribute to global environmental improvement and preservation.

We can say that this new mining method that saves energy and the compensation system that can gives compensation for energy saving are unique features of EDEL encrypted currency that can not be found in any existing encrypted currency. As a result, it could be the point of differentiating the EDEL encrypted currency from other virtual currencies.

EDEL encrypted currency,
- Coin that has most holders in the world
- Coin that is distributed most widely in the world
- Coin that is circulated anywhere in the world

We have these goals and through this we expect EDEL coin to be encrypted currency that is closest to legal tender as a true means of payment and a medium of transactions.
OUR BLOCKCHAIN
Edel coin’s blockchain environment can be operated with blockchain platform, which can efficiently fuse with PCR framework. For example, it can converge various blockchains such as EOS, Stellar, Ripple. blockchain operation focuses on minimizing energy resources by presetting limited amount to circulate, not mining based currency.

We would like to select blockchain as a solution to prevent double counting of carbon certified emissions reduction. It’s in order to apply mining and transactional information transparently and prevent resales of transaction in advance. Even though two same nodes are created due to the feature of consensus algorithm of blockchain, blocks that are composed of short nodes perish according to “The longest chain wins” Rule that only selects the longest block with blocks connected consistently. We can solve double counting issue with just this rule.

PCR blockchain is implemented based on data received from CRM device. CRM device is fitted with eco-friendly vehicles, and the carbon emission quantity that is reduced compared to fossil fuel vehicles on the same stretch of road is sent to PCR blockchain after going through modulation encryption above.

After identifying repetition, counterfeit and falsification of data, only data which integrity is verified is recorded in blockchain node through agreement on the network.

If there is at least 1 agreement, it uses agreed method which adding nodes is possible. This is different from mining such as Bitcoin and Ethereum which are based on Hardware Resource, and it uses the method of minimizing energy usage.

The data calculated from CRM device is coded into either public or private key and transferred to a driver in hash process based on SHA3 algorithm. It is designed to allow multi-drivers settings and each driver’s record on blockchain node. IC card, NFC and biometrics can be applied for user verification.

The total amount available of mining (carbon emission reduction data that is verified in CRM) is a billion EDL, and it’s limited up to maximum 274,000 EDL per day. The value of 1 EDL is given by 1 ton of CO2, and
reduction of carbon emission is rewarded with EDL. Transfer of ownership of carbon credits and reward followed by reduction activity are available through smart contract, and the contract is implemented on blockchain, so credibility and transparency are secured. The value preservation of EDEL Coin has the goal of creating stable value by interlocking with international carbon credits trade, and it enables carbon emission reduction in other business fields to be realized and verified easily.

Real-time monitoring is available for vehicles with CRM device equipped, and they can collect data such as driving distance, driving path, and carbon emission quantity. This can be applied to particular transportation sectors, and it apprehends current status through sensor mounted on CRM and transfers information to the control center. It can deliver information such as the shortest path by connecting with road traffic information, and real-time control of fuel efficiency is also possible. Driving information at this moment is saved in PCR blockchain, and correction by personal manipulation is impossible, so carbon emission reduction can be computed with verified data.

Carbon reduction data calculation by using AI algorithm

The application of AI (Artificial Intelligence) engine can calculate attributes of fuel efficiency for each road section by learning the standard of fuel efficiency which vary according to the status of road based on the collected data, and can decide the criteria of carbon emission for each section accordingly. Data for each section is more accurate when the driving time is longer, and it can calculate more accurate figures of carbon emission based on carbon emission that is assigned to vehicles and carbon emission of each road section.

Applied technology of EDEL Coin Marketplace

PCR blockchain is planning to design and develop Legacy Network with carbon credits exchange. It enables trade by converting into cryptocurrency for international trades and trades with companies, and it’s operated based on reliable blockchain data, so it makes double sales or trade with false data impossible.
Trade is available through PC web and mobile application, and especially, people can check the information of EDEL COIN rewards and usage in mobile app. Transmission and reception of cryptocurrency, guide about the use of coin, and payment method in offline stores will also be developed and managed.

**dApps**

EDEL coins are ethereum based DAPP (Decentralized Application) coins. The various DAPs in the PCR system operate on the Ethereum platform and are based on the carbon footprint of electricity transport and are designed to flexibly cope with different operators. It can be composed of different blockchain networks from individual transportation methods to multiple transportation methods, and it is designed to enable smart contract between blockchains for each group.

For agreement, the agreement between the Full Node Blockchain is verified and the sub node blockchain can be configured with the permission of Light Node Blockchain.
It is also possible to use the carbon reduction data collected from the CRM Device as it is, and it is also possible to process the transformation data according to the business model in the PCR Server to participate in the blockchain.

Various DAPPs operate on the Ethereum platform. Blockchain, which consists of Group A data, performs data integrity verification without data processing, compensates for the amount of carbon reduction by EDEL and joins the Blockchain Network in the end of the day. This is an example of compensation for the amount of carbon reduction achieved by converting personal transportation to electricity.

Group B and B-1 are composed of a group B-1 at a node of Group B and a business operator and a user. At this time, the carbon reduction amount of Group B is calculated on the basis of the total operation information data at the time of vehicle start-on/off. Group B is a taxi operator, and Group B-1 is an example of a taxi passenger. The carbon reductions in Group B-1 are calculated based on the carbon reduction data by Group B’s taxi meter start and end intervals.

Group C and C-1 can be distinguished as examples of electric bus operators and passengers. Group C consists of n Group C-n in one node. At this time, the carbon reduction amount of Group C-n is calculated based on the carbon reduction data of the operation section of the Group C transportation card settlement system.

The operating structure of Groups A, B, and C is illustrated in the following figure. The role of the PCR Server is to validate the collected carbon reduction data to participate in the Main Net and to monitor the data analysis, statistics and trading. The PCR server is operated by operating model and it is designed to operate by minimizing the load for different transactions.

The transaction time of EDEL Coin Trading Server is selected as Blockchain which can be processed within 20 seconds of Worst Case, and Retry is possible in case of transaction error. In the future, if another kinds of blockchain is added, EDEL GateNode is applied to enable interworking between different blockchains.
Group A Operational structure

Group A Blockchain

- Member Information
- CRM Device
- Actual Driving Information
- Calculated Carbon Reduction
- Hash Key

Group A: Personal electric car

- Electric car has built-in CRM device
  - Built-in auto-run, background run, and auto shutdown of CRM devices

### Group A Blockchain

- EDEL Gate Node
- Edel Coin compensation & Add to Blockchain

EDEL Gate Node enables Smart Contract between different Blockchain.

### Electronic Vehicle with Builtin CRM device

- Auto-run/Background operation
- Auto login
- Operation data transmission
- Auto shutdown

### Server

- Member management (electric car)
- Operation data processing department
- EDEL Blockchain peristalsis (Coin generation/inquiry/transaction)

### Security

- Encryption (AES256)
- Local DB

EDEL Blockchain network
A PLATFORM OF REWARDING SYSTEM FOR CARBON EMISSION REDUCTIONS USING CRYPTOCURRENCY EDELCOIN

**Group A Operational structure**

**Group A Blockchain**

<table>
<thead>
<tr>
<th>Member information</th>
<th>CRM Device</th>
<th>Actual driving information</th>
<th>Calculated Carbon Reduction</th>
<th>Hash Key</th>
</tr>
</thead>
</table>

**Group A: Personal electric car**

- CRM Device
- PCR Server
- Edel Coin compensation & Add to Blockchain

EDEL Gate Node enables Smart Contract between different Blockchain.

**Group C Operational structure**

**Group C Blockchain**

<table>
<thead>
<tr>
<th>Company information</th>
<th>CRM Device</th>
<th>Operational information by route</th>
<th>Cumulative Carbon Reduction</th>
<th>Hash Key</th>
</tr>
</thead>
</table>

**Group C-1 Node**

<table>
<thead>
<tr>
<th>Member information</th>
<th>Transportation Card Payment Information</th>
<th>Actual use section information</th>
<th>Calculated Carbon Reduction</th>
<th>Hash Key</th>
</tr>
</thead>
</table>

**Electric bus Transportation Businessman**

**Group C DATA send**

**Electric Customer Using**

**Group C-1 DATA send**

- PCR Server
- After collecting data for Group C, C-1 calculates The Carbon reduction of C-1. At this time, Group C is processed first participate in Blockchain.
The Electric public transportation system creates an electric wallet and embeds it in a public transportation card IC.

Development of electronic wallet compatible with transportation card payment system
### CRM Device

**Function:** Monitoring and measuring Fuel consumption  
**Purpose:** To collect data on amount of CO2 reduced  
**Benefit:** Cost efficient & easy to measure fuel efficiency & CO2 emission  
**Difference:** Software algorithm to accurately calculate fuel efficiency and CO2 emissions by using vehicle information and GPS Data.

*Patent (pending) - #10-2018-0037672*

Real time measurement device for providing data of carbon dioxide output in cryptocurrency rewarding system for compensating for carbon emission reduction with cryptocurrency.

### REWARD System

**Function:** Rewarding people according to the amount of CO2 reduced  
**Purpose:** To reduce more CO2 and induce more participation of people  
**Benefit:** Most cost efficient & efficient way to reduce CO2 emissions  
**Difference:** Positive synergy created by combining energy saving, CO2 reduction, and blockchain technology

*Patent (pending) # 10-2018-003724*

Reward system for carbon emission reduction using cryptocurrency.

### BLOCKCHAIN Platform

**Function:** Providing non-competitive & non-resource intensive blockchain network  
**Purpose:** To build more cost effective, practical, eco-friendly, and energy efficient blockchain network & cryptocurrency.

**Benefit:** The reduction of CO2 emissions from Carbon reduction Mining proactive participation of people to reduce CO2 by providing rewards according to the amount of CO2 emissions reduced.

**Difference:** Edelcoin blockchain requires the least amount of electricity compared to other blockchain technologies. It also helps people to reduce more CO2 emissions more proactively.

*Patent:* N/A
## PAYMENT System

<table>
<thead>
<tr>
<th>Function</th>
<th>Inducing practical of cryptocurrency in everyday life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td>To provide benefits or rewards when people purchasing eco friendly products or services with Edelcoins in real life.</td>
</tr>
<tr>
<td>Benefit</td>
<td>Increasing the accessibility and usability of cryptocurrency for peoples. It will lower the hidden cost consumer have to pay when purchasing.</td>
</tr>
<tr>
<td>Difference</td>
<td>Positive synergy created by combining energy saving, CO2 reduction, and blockchain technology.</td>
</tr>
<tr>
<td>Patent (pending)</td>
<td># 10-2018-0033723</td>
</tr>
<tr>
<td></td>
<td>Cryptocurrency payment system for providing discount as a reward for carbon emission reduction</td>
</tr>
</tbody>
</table>

## Big Data

<table>
<thead>
<tr>
<th>Function</th>
<th>Collection &amp; analyzing the data from vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td>To utilize the data to get information on each driver’s fuel consumption, CO2 emissions, and road &amp; traffic conditions. To establish more effective &amp; effective decision based on the data.</td>
</tr>
<tr>
<td>Benefit</td>
<td>When more people use Edelcoin blockchain and Edelcoin, the accuracy of many valuable information will increase. And it will help people to make better decisions in everyday life.</td>
</tr>
<tr>
<td>Difference</td>
<td>Most effective &amp; efficient way to collect &amp; analyze big data in real time.</td>
</tr>
<tr>
<td>Patent</td>
<td>#101763915</td>
</tr>
<tr>
<td></td>
<td>System for collecting and analyzing big data by monitoring car’s and road’s conditions</td>
</tr>
</tbody>
</table>
REFERENCES

CO2 reduction and depletion of fossil fuels http://www.mech.nias.ac.jp/biomass/12kou-ko.pdf


Man-made CO2 Emissions http://www.oica.net/category/climate-change-and-co2/

Eco-driving, the best driving reducing greenhouse gas emissions http://tgis.seoul.go.kr/traffic_safety/data/general/05/에코드라이브.pdf


Eco-driving, a small driving habit to change the future http://www.ecodriving.kr/web/ecoDrive/ecoDriving.jsp?act_cls=1&act_id=26&


Enormous electric power consumption of Bitcoin mining... "Serious environmental threats" http://news.naver.com/main/read.nhn?mode=LSD&mid=sec&oid=001&aid=0009737086&sid1=001

Bitcoin Mining Operations Now Use More Energy Than Ireland https://www.greentechmedia.com/articles/read/bitcoin-uses-more-energy-than-ireland#gs.kdH1zf8
xiv EOS Token Distribution - https://eos.io/instructions


 xx 1 kilowatt-hour http://blueskymodel.org/kilowatt-hour

 xi Cryptocurrency statistics https://bitinfocharts.com/

 xii WORLD POPULATION http://www.worldometers.info

ROAD MAP
Early DATAM

- 2006.12: Hypermiling technology development completed (iEDS)
- 2008.03: Completed Fuel-cut map creation technology
- 2008.07: Completed Eco-diving monitoring technology
- 2010.12: Vehicle CDM project co-promotion agreement (Swiss Grüter consulting)
- 2012.12: Eco-Drive Zone Installation and monitoring (Incheon)
- 2013.02: Developed OBD II and Smart App for Collecting Vehicle Big Data
- 2013.03: Eco-Drive Monitoring Center Installation
- 2014.04: Development of vehicle GHG monitoring technology using GPS
- 2014-2015: Performed government development project (KTSA, KICT)

DATAM core
- Registered the world’s first patent for big-data monitoring system for vehicles GHG emissions

DATAM is born in Hong Kong
- DATAM Monitoring Center Opened
- Establish PCR system concept

DATAM’s children were born
- Introduction and demonstration of PCR system invited by Vietnam Block Chain Association

Overseas projects
- 26 April, MPI Lao PDR official Invitation: 4th Industrial Revolution - DATAM Project Announced
- Registered as a UN CCC (Climate Chain Coalition) member

Listed on Token Exchange & Build PCR-EDEL Platform
- IEO (Initial Exchange Offering)
- CRM Device Production
- EDEL coin PCR compensation system construction

DATAM project & service start
- Established Green Pass Card issuing and payment system for EDEL coin
- The DATAM project will apply for certification as one of the UNFCCC CDM projects.

Expansion of DATAM Innovation Technology Project
- Hotel PCR system platform construction
- Fuel-cut eco-drive zone road project
- 4th industry eco-convergence project
TOKEN DISTRIBUTION PLAN
EDELCOIN is scheduled to issue a total of 2 billion. One billion of these are issued on the ERC-20 basis, and the remaining one billion EDELs are issued on the carbon reduction proof block chain.

Of the 1 billion EDELs issued on the ERC-20 base, 400 million are project coins. This is not circulated on the market. However, it is used only for collateral for funding invested in the infrastructure of the DATAM project.

DATAM is pursuing a project to realize carbon reduction by converting public transportation in developing countries or underdeveloped countries into eco-friendly public transportation based on patented technology. Eco-friendly public transportation is made up of 100% investment in DATAM. It requires a lot of money. But the DATAM project is highly feasible.

Because the proceeds are 5% of the customer’s usage and 3% of the electric battery charge for the free supply of eco-friendly public transportation electric vehicles, the investment amount is 100% within 1.5 ~ 2 years, so it is very good in terms of business feasibility. The carbon credits secured are collateral revenue.

The secured carbon credits are secured by the prevention of double counting and the mechanism by the correct MRV system, so they can be evaluated and sold at the Emissions Exchange.

At the same time as the loan is repaid, DATAM’s cryptocurrency will be revalued as a higher collateral and a higher credit limit will be obtained. This process is repeated over and over again. This will increase the infrastructure for eco-friendly public transportation, and the carbon credits secured will increase. Also, the value of DATAM’s cryptocurrency will increase.

The funds raised are used Research & Development, System Construction, Device Production, PCR App, Distribution service, Marketing & Promotion, Operation & Administration, and Legal & Compliance. Also, the number of EDELCOIN paid to the team and advisor is 80 million, which is locked to the completion of ecosystem construction.
PATENTS
Registered patents

Registration No.: 1017639150000
Registration Date: 20170726
Title of Invention
System For Collecting And Analyzing Big Data By Monitoring Car's And Road's Conditions
Abstract
Disclosed is the big data collection and analysis system including the mobile communication terminal, and the mobile communication terminal and the safe driving guide server which receives data about the position of the vehicle generated with data about the state of vehicle monitoring apparatus for being connected with the Bluetooth communication and the state of vehicle collected by the state of vehicle monitoring apparatus and mobile communication terminal and vibration from the mobile communication terminal and it evaluates the road condition from data about the above-mentioned state of vehicle received and guides the safe driving based on data about the above-mentioned state of vehicle received and above-mentioned road condition evaluated. And in the big data collection and the analysis system of the present invention, the safe driving guide server evaluates the level of vibrations according to the position of the vehicle and speed or the vibration pattern and the road condition of the relevant position is evaluated as safety or the danger and in case any kind of vehicle travels by the speed in which the road condition is dangerous it notifies informing to the mobile communication terminal of the target vehicles. The big data collection and the analysis system according to the invention evaluate the road condition from the information about the state of vehicle and by guiding the speed in which the operator performs the safe driving according to that road condition the operator safely drives.

Registration No.: 1017031150000
Registration Date: 20170131
Title of Invention
Cruise Control System Implementing Eco-Drive Function Realizing Fuel Efficiency Enhancement In Downhill Section
Abstract
Disclosed are the base rate \( V_{(\text{sub})1} \) when the downhill section instead of starts in the branch which starts the second marriage inside with the second marriage speed \( V_{(\text{second marriage inside})} \) which is the pre-set constant and in which the downhill section is automatically finished in the second marriage inside start speed \( V_{(\text{sub})2} \) settled according to the procedure which is beneath determined from the initial point of the downhill section before the downhill section is finished after it allows the automatically to perform the fuel barrier inertia driving in the memory with steady speed driving when the vehicle travels the downhill section and the constant speed driving control apparatus which later continues the steady speed driving it becomes the same speed. Because the echo drive function of the ideal navigation pattern instead of the steady speed driving in the downhill section functions the fuel ratio of vehicle is optimally improved and the constant speed driving control apparatus of the invention is economic.
Title of Invention
Eco-Drive Inducement Device Realizing Fuel Efficiency Enhancement In Downhill Section

Abstract
In the vehicle is the downhill section, the echo drive guidance system which it induces in order to perform the ideal navigation pattern achieving the optimal continued ratio in the downhill section by going by boat with the fuel barrier inertia driving in advance and making the second marriage inside in any kind of spot of the downhill section and returning to the original speed of the fuel barrier inertia driving total, in other words, the base rate from the spot in which the downhill section is finished is disclosed. In the echo drive guidance system of the invention, the operator the downhill section, since it helps to perform the ideal navigation pattern achieving the optimal continued ratio it is useful.

Title of Invention
Method for Making Automobile Driving Record Executed on Smart Phone

Abstract
The car driving recording method of the smart phone base which uses the smart phone as the black box of automobile in the smart phone by executing the proper application program is disclosed. According to the method according to the present invention is time the image and audio data, location information, speed, impulse quantity, collision direction, the vehicle drive information etc, it stores to the file and it determines as the event occurrence if the impulse quantity is the fixed level or greater and the accidental fact is informed the emergency rescue center of if moreover, the impulse quantity is the fixed level or greater.

Title of Invention
Real time measurement device for providing data of carbon dioxide output in cryptocurrency rewarding system for compensating for carbon emission reduction with cryptocurrency

Abstract
S / W technology that realizes artificial intelligence system which can achieve over 98% accuracy is a device for measuring fuel consumption and GHG emissions of automobiles using GPS data that self corrects the program originally embedded by self-analyzing the correlation between car and road traffic information by deeply learning the collected big data from automobile operation monitoring system.
Patent Application No. 1019145750000
Registration Date: 20181029
PCT / KR2018 / 003554
Title of Invention
Cryptocurrency payment system for providing discount as a reward for carbon emission reduction
Abstract
By providing cryptocurrency as a compensation to those who achieve carbon reduction by electric vehicles it is possible to promptly obtain the distribution of cryptocurrency to support the practical use of cryptocurrency and it can also promote carbon emission reduction more effectively. Furthermore, a network system that can be paid by cryptocurrency when using and renting an electric car/ electric motorcycles/ bicycles.

Patent Application No. 1019145760000
Registration Date: 20181029
PCT / KR2018 / 003556
Title of Invention
Compensation system for carbon emission reduction using cryptocurrency
Abstract
A technical patent of Proof of Carbon Reduction (PCR) system. A reward system using cryptocurrency that rapidly obtains the circulation of cryptocurrency, effectively promotes the reduction of carbon emissions and supports the practical use of cryptocurrency by providing cryptocurrency as a compensation for those reducing carbon emissions.

Patent Application No. 1019259880000
Registration Date: 20181130
PCT / KR2018 / 006373
Title of Invention
Method For Calculating Energy Consumption Of Car By Utilizing Deep Learning For Implementing The Reduction Of Carbon Discharge
Abstract
It collects data from the speed of the subject vehicle, the tilt angle of the road on which the subject vehicle is driven, and the actual energy consumption of the subject vehicle measured by the data collection device installed on the actual test vehicle at each predetermined time interval. An artificial neural energy consumption calculator installed in a driving vehicle measures the speed of the driving vehicle, the angle of inclination of the road it travels on every predetermined time interval, and uses this as an input to the artificial neural network. By using the values of established parameters received from the artificial neural network server, the method of calculating the energy consumption of the vehicle, which calculates the energy consumption of the driving vehicle, is initiated. The method of calculating the energy consumption of a vehicle based on this invention can be more accurate and more flexible in calculating the energy consumption of a vehicle by using artificial neural networks, especially Deep Learning.
OUR TEAM
A PLATFORM OF REWARDING SYSTEM FOR CARBON EMISSION REDUCTIONS USING CRYPTOCURRENCY EDELCOIN

Team & Engineers

James Lee  
Head and Founder

Dr. Paul Jeong  
Manager of Engineering Work Project Planner

Dr. Kwang-ho, Ko  
Head of DATAM Laboratory

Jay Chun  
Head CTO

Jin-jun Kim  
Director of Carbon Emissions Certification and Transactions

Dr. Dong-won, Lee  
General Manager of PCR System Development

Dr. Gab-rae, Lee  
General manager of blockchain technology development.

Dr. Tiger Doo  
Management Support

Dr. Hee-chan, Do  
Director of Carbon Emissions Certification and Transactions

Jae-Hyung Kim  
CTO

Seong-kook Kim  
CIO

Jin Wook Lee  
Block chain technology developer

YOO WON KYU (ALFRED)  
CFO

Dr. In-sung, Jang  
Overseas project sales

Shalom Nguyen  
Strategic Specialist & Businessman.

Ta Thi Mai Phuong  
International Project Sales
James Lee (Young-cheol, Lee)

- 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)
Dr. Paul Jeong (Seung-hyun, Jeong)

Paul Jeong is a Ph.D in environmental engineering. He received doctor degree from Pukyong national university in South Korea.
His major interest covers measurement of eco-driving effects using automobile monitoring system. He presented 5 papers in the field of eco-driving experiment and calculation. He has 7 patents in the automotive engineering. He is currently President of PCRSYTEM Co., Ltd. and is an expert in the field of vehicle greenhouse gases in Korea. He worked with James Lee for 15 years on automotive greenhouse gas monitoring. He holds SCI level papers and many papers at home and abroad. He is a technology developer and project planner for DATAM. He is registered CCC (Climate Chain Coalition) team member as researcher for technology and R&D.

Dr. Kwang-ho, Ko

Kwang-Ho Ko is a professor of Pyeongtaek University. He is a Ph.D in automotive engineering. He received doctor degree from Seoul national university in South Korea. His major interest covers eco-driving method and efficient driving using altitude change. He presented 20 papers in the field of eco-driving experiment and calculation. He has 10 patents in the automotive engineering. He is known as one of the best experts in Korea for automobile internal combustion engine and eco-drive related fields. He was a member of the eco-drive expert committee of the Ministry of Environment and the Ministry of Land. He has been in the eco-drive business with James and Paul for 12 years. He is the general manager of DATAM's eco-drive technology development. He is registered CCC (Climate Chain Coalition) team member as researcher for technology and R&D.
Jay Chun (Jin-ho, Chun)

Jay Chun is a M.S. in computer engineering. He received his degree from Korea University. He was a senior researcher at LG Electronics and CTO of Crosstech. He was responsible for developing eco-drive monitoring devices and CRM devices. He, James and Paul have been in car surveillance for 10 years. He is the main author of this white paper and is a developer of PCR systems. He is the general manager of software and hardware development for the DATAM project.

Dr. Dong-won, Lee

Dong-won, Lee has a Ph.D. in Mechanical Engineering. He received his doctor’s degree from KAIST in South Korea. He was a professor at the Ajou Motor College. He is an advisor of DATAM's eco-drive technology development.

Dr. Gab-rae, Lee

Gab-rae, Lee has a Ph.D. in intelligence control. He received his doctor’s degree from Kyungpook National University in South Korea. He is a general manager of DATAM's blockchain technology development.
Jae-Hyung Kim

- Project(Product) Management
  - H/W, S/W mechanism and production management by product development
- Software Engineering
  - Embedded System Design, Device Driver, BSP Porting
  - Mobile TV for DVB-T, T-DMB, DAB/+ & ISDB-T ISEG
  - Digital TV for ATSC, ISDB-T & DVB-T
  - Embedded CE AP & BSP
  - Android & iOS App
  - RTOS Porting & App Dev.

- Hardware Engineering
  - STM, TELECHIPS, LSI Logic, Marvel, Freescale, SEC, TI-DSP
  - ARM, MIPS, PowerPC, COTEX & MICOM
- Programming Languages
  - C/C++, ASM, Visual C++, Java, Javascript, Objective-C, Html
- Operating Systems
  - VxWorks, Nucleus, uCOS, Embedded Linux, Embedded CE
- Trainer career
  - VxWorks Basic, Device Driver & BSP
  - OS-9/9K Basic & Device Driver
  - Device Driver for Linux
  - Kernel Porting for Linux

PROFESSIONAL EXPERIENCE
- t5online, inc., Seoul, Korea / CEO / SI based on Smart Phone & Server s/w dev. company
- Yamaia Co.,Ltd., Seoul, Korea / S/W Dev. & Project Manager / SI based on Smart Phone & Server s/w dev. company
- MERITECH Co.,Ltd., Yongin, Korea / SE & Project Manager : In charge of consumer project management / Portable Multimedia Player & Digital Broadcasting Set company
- AstonLinux, Seoul, Korea / Senior Software Engineer & Project Manager / Embedded Linux solution provider
- DaiShin Telecommunication Co., Ltd., Seoul, Korea / Senior Software Engineer / Embedded Linux solution provider
- AceTronix, Inc., Seoul, Korea / Senior Software Engineer / Embedded solution provider for Military, IT & FA
Jin-jun Kim

Jin-jun, Kim completed the CEO course at Seoul National University College of Engineering. He is a certified “CDM(Clean Development Mechanism) Verifier”. He is Korea's top transportation expert and an authority on carbon emissions verification in the field of roads and transportation.

He is currently the CEO of South Pacific Co., Ltd. and is an executive officer at the Korea ITS Society also in the Korea Transportation Association. He is in charge of carbon credit certification and transaction-related chief executive officer of the Datam Project.

Dr. Hee-chan, Do

Hee-Chan, Do is a Ph.D in electrical engineering. He received doctor degree from University of Texas at Arington. His major interest covers Carbon Emissions Certification and Transactions. He is currently the CTO of South Pacific Co., Ltd.

He is in charge of carbon credit certification and transaction-related senior researcher of the Datam Project.
**Seong-kook Kim**

He is a professional programmer. He is also proficient in web design and management. His profile is as follows.

- Sejong Prime Inc. / CEO / SI
- KORECEN Co., Ltd. (Biometric authentication)/ Conductor / Planning and Coordination Office
- Sang-A C&S / CEO / Software Engineering (Fullstack Development)
- Triplemedia Co., Ltd. / CTO / Electronic bulletin board development team
- Dio Information Technology / Manager / Web Service Development Team
- Triple i Co., Ltd. / CTO / Development of semiconductor equipment S/W
- Korean Linux User Group / Area presidents(Suwon)

**Jin Wook Lee**

Jin Wook Lee graduated Indiana University with Informatics Major. His Major interest covers developing block chain development, Cryptocurrencies, Software development, Web development etc. He is seeking and looking forward to challenging opportunities to apply his existing skills, knowledge and experience, and further enhance them in the process.

He strongly believes that in today’s environment with thousands of vendors and providers flooding the market, it is crucial to orient your sales process around your product’s value to ensure you build quality and trusting relationships with your clients.

**Dr. Tiger Doo**

Dr. Tiger Doo is a Ph.D in management consulting. He received doctor degree from Pusan national university in South Korea. His major interest covers management of eco-driving effects using bus monitoring device. He is currently CEO of U-Car EMS Limited. He is responsible for sales and administration support for DATAM.
A PLATFORM OF REWARDING SYSTEM FOR CARBON EMISSION REDUCTIONS USING CRYPTOCURRENCY EDDELCOIN

Dr. In-sung, Jang

In-sung Jang has a Ph.D. in Business Administration. He received his doctor’s degree from Dong-A university in South Korea. He is involved in DATAM’s overseas projects.

YOO WON KYU (ALFRED)

CFO

KUNKUK UNIV. EDUCATION COLLEGDE : Pre Bachelor
YONSEI UNIV. FLI : English Advance II
KNOU INFOTEK COLLEGDE : Ba. Sci
SEOUL NATIONAL UNIV. TECH. : e-Biz MBA crs
PHOENIX UNIV. : MA crs

• POWERTEK ENERGY PTE LTD, SINGAPORE : PRESIDENT DIRECTOR /SEP. 2014 – PRESENT
• INDONESIA CHAMBER OF COMMERCE : Marketing Director / JAN 2012- JAN 2014
• NOBLE CAPITAL RESOURCES (ASIA) LTD, SINGAPORE : COO / JAN 2012 - present
• SHANGHAI FINANCE CAPITAL PTY LTD, HONG KONG : Marketing Director / 2004 Jan-2010 Dec-Jun 2001
• Castle Music Group (Merged Universal Music Group) : Managing Director (Asia) / Dec 1998 - Jun 2001
• VOICE & DATA SYSTEMS, INC. Canada (Merged Facebook Telephone) : Marketing Director (Asia) Dec 1998 – Apr 2002
• PAMOUNT PRICTURES GROUP, USA : Licensing & Merchandising Div. Representative Korea Liaison Office / Jan 1997 – Feb 2000

Shalom Nguyen

Shalom Nguyen is strategic specialist & businessman. Graduated from Seoul Hoseo Technical College.
Business and Foreign Investment Consultancy in Vietnam; Research and Development Blockchain & Fintech;
Ceo Of Kotra Vina Corporation; A Co-founder of GBA Group (GBA Fintech).
Chairman of FDI Vietnam Corporation;

Major activities
- Permanent representative of the Vietnam Association of Business Culture Development.
- Founding member of the Vietnam National Entrepreneur Associations
- Chairman of Startup Blockchain Fintech Club / Cryptocurrency Exchanges (exc.vn) and Bitnews.vn
Advisors

Dr. Souli NANTHVONG

Souli NANTHAVONG has a Ph.D. in Chemistry. He received his doctor’s degree from French National University. He was a professor at the University of Dentistry. He was the Minister of Environment and the Prime Minister’s Office and Auditor General of Lao PDR.

Ir. Somphone PHANOUSITH

Ir. Somphone PHANOUSITH graduated from Quebec Agricultural Economics Department in Canada. He served as the Prime Minister’s assistant of Laos and as the permanent secretary general of the National Science Council.

Kyung-bae Kim

TIN Traffic Tourism Cable TV “28 Transportation Sites” Progress and coverage
- MBN Maekyung TV “Motor Life” progress and coverage
- WOW Hankyung TV “Motor Today” progress and coverage
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- Current TBN Korea Traffic Broadcasting “Traffic Era” Traffic Expert
- President, Korea Automotive Technology Association
- President, Korea Automobile Association
- Prefectural Eco-Drive Campaign Public Relations Chairperson
- Prefecture TEN Traffic News Headquarters / General Manager and Representative (Traffic Environment TV Co., Ltd)
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Sung-chul, Choi is a Ph.D in electronics. He received doctor degree from Ajou University in South Korea. He was a professor at the Ajou Motor College. He is an advisor of DATAM's CRM device technology development.

Dr. Man-jun, Kwon

Man-jun, Kwon is a Ph.D in computer program. He received doctor degree from Chungnam National University in South Korea. He was a professor at the Ajou Motor College. He is an advisor of DATAM's blockchain technology development.
APPENDIX
Terminology

**CRM (Carbon Reduction Mining)** Carbon Reduction Mining is performed by actions or methods that reduce fuel consumption compared with baseline and quantitatively measuring the results using CRM devices.

**CRM device** is an easy-to-install device that can be plugged into vehicles. Then it monitors and measures the CO2 emission changes and transmits the data to Edelcoin Blockchain network.

**PCR (Proof of Carbon Reduction)** Based on the data collected from CRM device, Edelcoin Blockchain evaluates the data through validation and valuation process to calculate the exact amount of carbon emission reduced. It is called the Proof of Carbon Reduction.

**Edelcoin Reward System** Edelcoin Blockchain converts the amount of CO2 reduced into Edelcoins and the coins will be transferred to the owner of CRM device as a reward automatically.

**POW (Proof of Work)** a protocol and a requirement to define an expensive computer calculation, also called mining, that needs to be performed in order to create a new group of trustless transactions (the so-called block) on a blockchain.

**POS (Proof of Stake)** a different way to validate transactions based and achieve the distributed consensus. The creator of a new block is chosen in a deterministic way, depending on its wealth, also defined as stake.

**OBD-II (On-Board Diagnostics II)** a standard introduced in the mid-’90s, provides almost complete engine control and also monitors parts of the chassis, body and accessory devices, as well as the diagnostic control network of the car.

**PIDs (Parameter IDs)** codes used to request data from a vehicle, required to support OBD-II diagnostics.
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