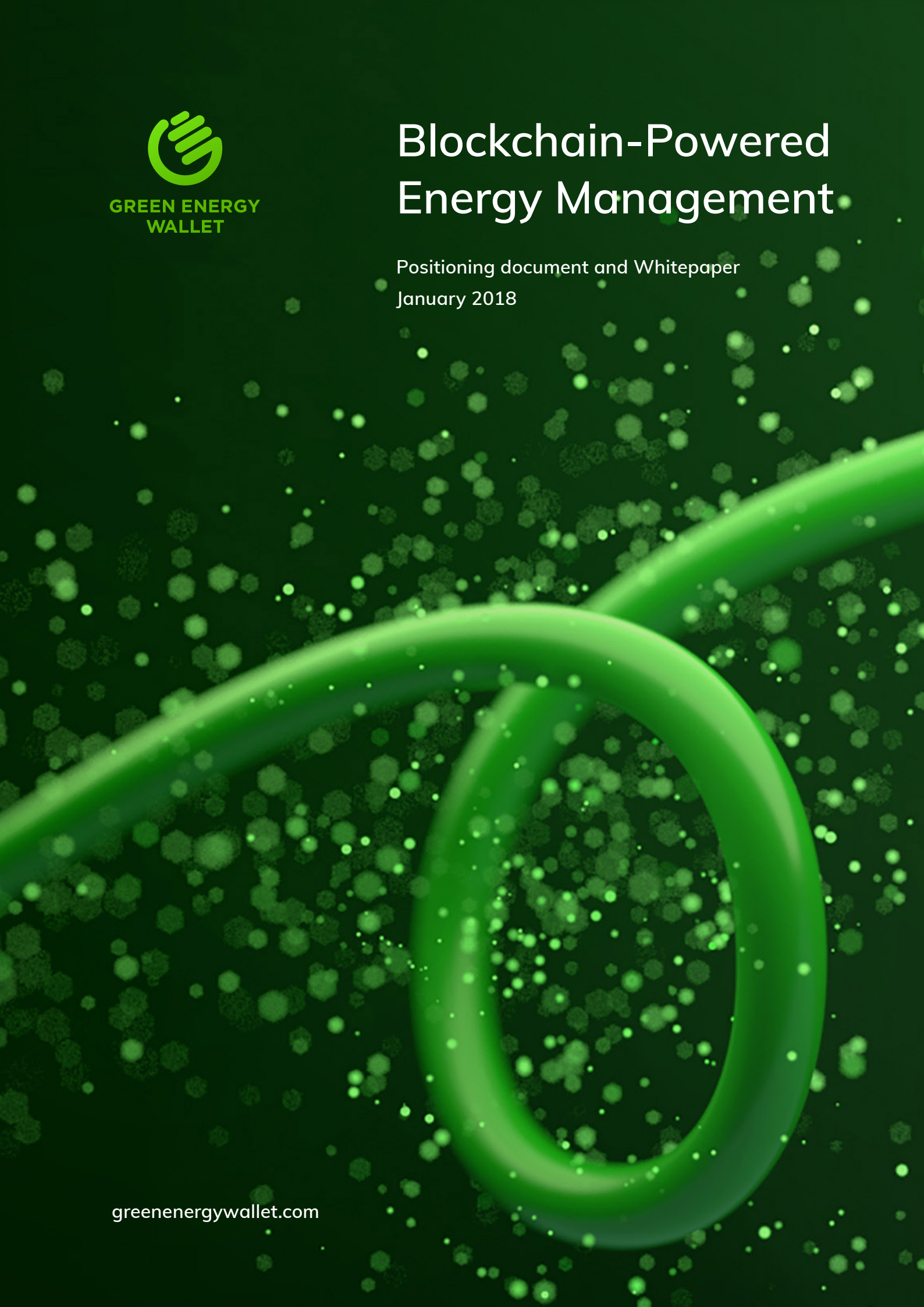
GREEN ENERGY WALLET

Blockchain-Powered Energy Management

Positioning document and Whitepaper

January 2018



greenenergywallet.com

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One

Manifesto

Two substantial changes will determine our future: more renewable energies and more electric vehicles. Crude oil, natural gas, and coal cover today the majority of our global energy needs. But the related emissions of greenhouse gases have caused the planet's climate to change in an unnatural manner. The world is ready for change, and the political will to act on environmental issues is here.

Unfortunately, renewables are not as reliable as conventional power plants, and electricity cannot be stored in the power grid. To ensure that the transition away from fossil fuels is a practical and achievable goal, we need efficient facilities to store renewable energy.

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> All current forms of energy storage are considerably more expensive than using existing batteries.
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> Through our token reward program, battery owners have the incentive to provide us their battery.

Therefore, Green Energy Wallet (GEW) connects batteries of many electric vehicles to use this capacity as a large buffer store for renewable energy. Solar power systems and home batteries can also be integrated. We connect charging stations with the power grid to manage the electricity with flow either way between the power grid and the battery.

Bidirectional charging stations of several manufacturers can be connected to GEW. In addition, we will develop together with a partner a bidirectional charging station tailored for GEW.

GEW works together with the energy provider to buy electricity when the price is low because of overproduction and sell it high when the power grid system needs it. In addition, GEW can ensure the power supply of your home when the power network fails.

Our GEW app can communicate between the electric vehicle, home system, charging station, and power grid. Additionally, the GEW app will contain many more useful functions, such as providing easy access to the vehicle's and home's system settings and diagnostics.

GEW rewards clients through a GEW token reward system for providing buffer storage and data and for using our GEW network. The energy trading and the GEW token reward system will be based on blockchain technology.

Two

What is Green Energy Wallet?

THE GREEN ENERGY WALLET ENERGY MANAGEMENT

Two characteristics of electricity lead to issues in its use. First, electricity has to be consumed at the same time as it is generated. The proper amount of electricity must always be provided to meet varying levels of demand. The second characteristic is that the places where electricity is generated are usually dislocated from the locations of consumption. Generators and consumers are connected through a power grid and form a power system.

Power demand varies and the price of electricity changes accordingly. The price for electricity is higher at peak-demand periods, and is lower at off-peak times. At peaks suppliers must complement base-load power plants with flexible forms of power generation. The off-peak period, when less electricity is consumed than is generated, than there is the chance for owners of energy storage systems (ESS) to benefit financially.

The smart integration of electric vehicles and home batteries into the power grid

EV charging will have an increasing influence on the stability of the electricity grid, leading to greater demands on the connectivity and controllability of the charging system. →

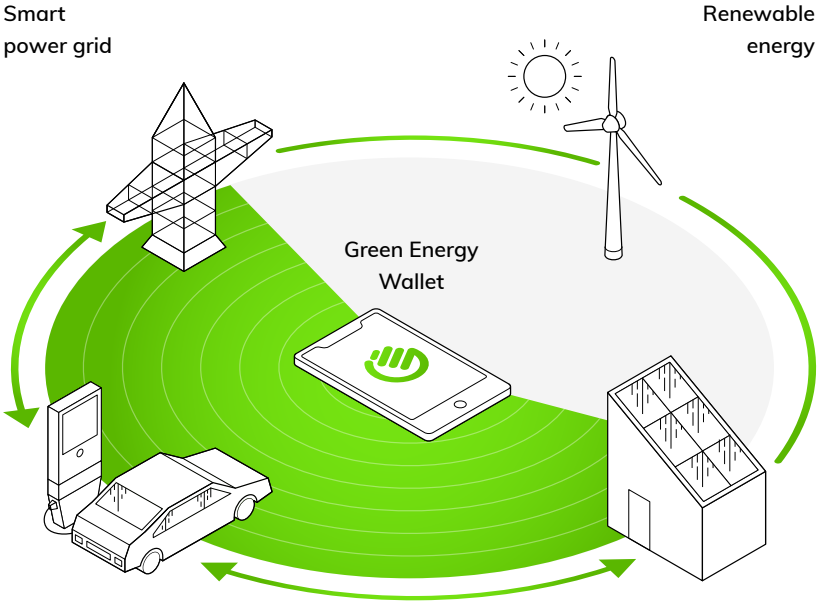

Figure 1: The GEW system of EV and HB integration into a smart grid of the future

The power electronics and the batteries in the vehicle will be used lucratively to provide grid services. To integrate electric vehicles into the grid and to build an intelligent and sustainable energy system, a control system for charging and discharging is necessary. GEW will optimize both hardware and software for communicating with the charging systems as well as develop and optimize algorithms for bidirectional charging.

THE GREEN ENERGY WALLET APP

The Green Energy Wallet app controls the system and runs all settings. It provides the software connection between the electric vehicle, the charging station, and the power grid. With this app, the user can charge or discharge an electric vehicle based on typical preferences or current needs. The app also provides other useful functions, such as access to car settings, statistics on mileage, consumption, driving style, the vehicle's current charge level, and GPS location. A good side effect is that intelligent battery charging lengthens battery life.

GEW rewards battery usage with a token named NRG. The amount of the NRG token depends on the capacity of storage and total time GEW is permitted to use the battery as a buffer store. The NRG token status is covered in real time by the GEW app. At all times, the user can check on the amount of NRG tokens already received and how many more could potentially be earned. The NRG token can be converted into energy or other assets on the blockchain.

The data collected by the GEW app are very valuable for car manufacturers, insurers, suppliers, and governments, including for the collection of statistics. If the user permits us to use their complete data or a part of their data, they will be rewarded with NRG tokens.

The GEW app will be developed by Lykke AG, which has deep experience working with blockchain technology.

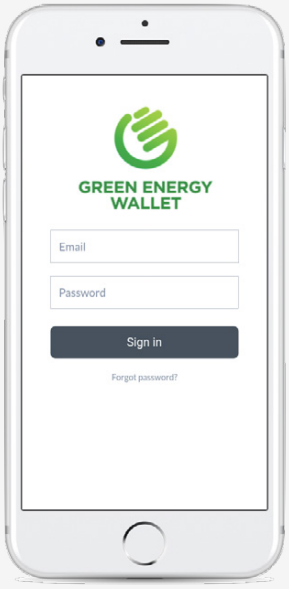

Figure 2: GEW app-Log in

Here are some functions of the GEW app:

Each user and each EV is registered. One EV may have multiple users, and the same user may have multiple EVs. Vehicle fleets can be connected and several charging stations as well. The user can see the main parameters of the EV like charging level, mileage, range and NRG token.

Here are some GEW app functions as an example:

- With a "set car temp" button, the user can set the temperature inside the EV.
- With the "charge now" button, the user can overwrite the planner and load the EV immediately.
- If the EV manufacturer offers an electronic key to open the vehicle, the user can access this key through the app.
- The app can also direct the user to the vehicle's location.

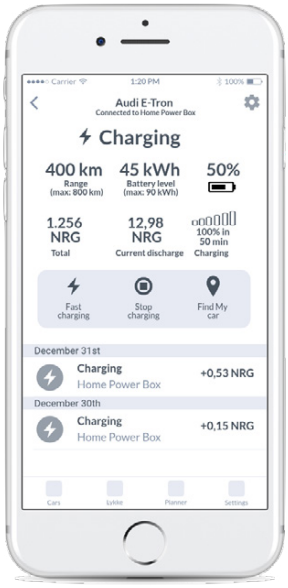

Figure 3: GEW app-charging

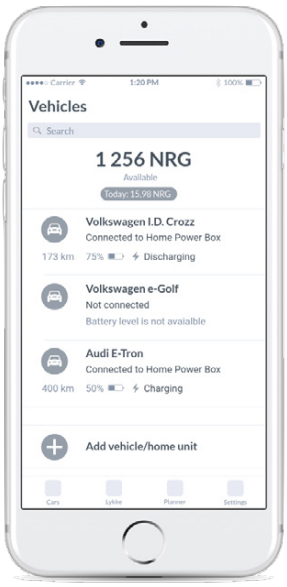

Figure 4: GEW app-EV selection

With a planner, the user can preset preferences for the upcoming weeks. If desired, the settings from one week can be brought over to the next week. The user can specify when he or she needs the car and how many kilometers he or she would like to drive on each day. For every kWh of battery capacity provided, the user earns NRG token. Multiple users can share cars and plan the availability of the individual vehicle. The energy consumption and maintenance costs in the case of car sharing can be billed individually. The users decide how they receive the NRG token for their share of the energy storage. The user can also see where the car is parked and be navigate to that place.

Charging stations will be added to a user. One user can own several charging stations. The owner can invite other users to use his or her stations, which means that he or she can also be invited by others to use their stations as well. If both are GEW users, the billing is done by GEW. If NRG token are won during charging, the points will be split by a predefined percentage.

Owners of charging stations can allow public access to their box. In this case, the charging station owner will be rewarded by the kWh charged into the guest car. This is an easy way for our users to multiply their positive impact on the environment while providing a valuable service – and a kind gesture – to other travelers.

With the GEW app, it is possible to find charging stations nearby.

Generally any battery or energy generation system, such as wind or solar power, can be connected to the GEW charging stations. The energy produced at home can also be used to charge EVs. In case of a blackout, the EV battery can be used to keep the house running.

Figure 5:
The GEW customer tailored power box

GEW CUSTOMER-TAILORED POWER BOX

In order to offer our customers the best possible functions, we are developing a bi-directional charging station together with a partner. This hardware component will supports the rapid charging and discharging of batteries. A bi-directional meter measures the flow of electricity in both directions from and to the grid. The user can connect a home battery or any private energy production system and transfer energy to where it is needed most at any given time. The electric vehicle can be charged with home-produced energy. The user's own home can be powered by the electric vehicle's battery. This secures a power backup during blackouts. It also means the electric vehicle's battery could replace an expensive home battery storage system.

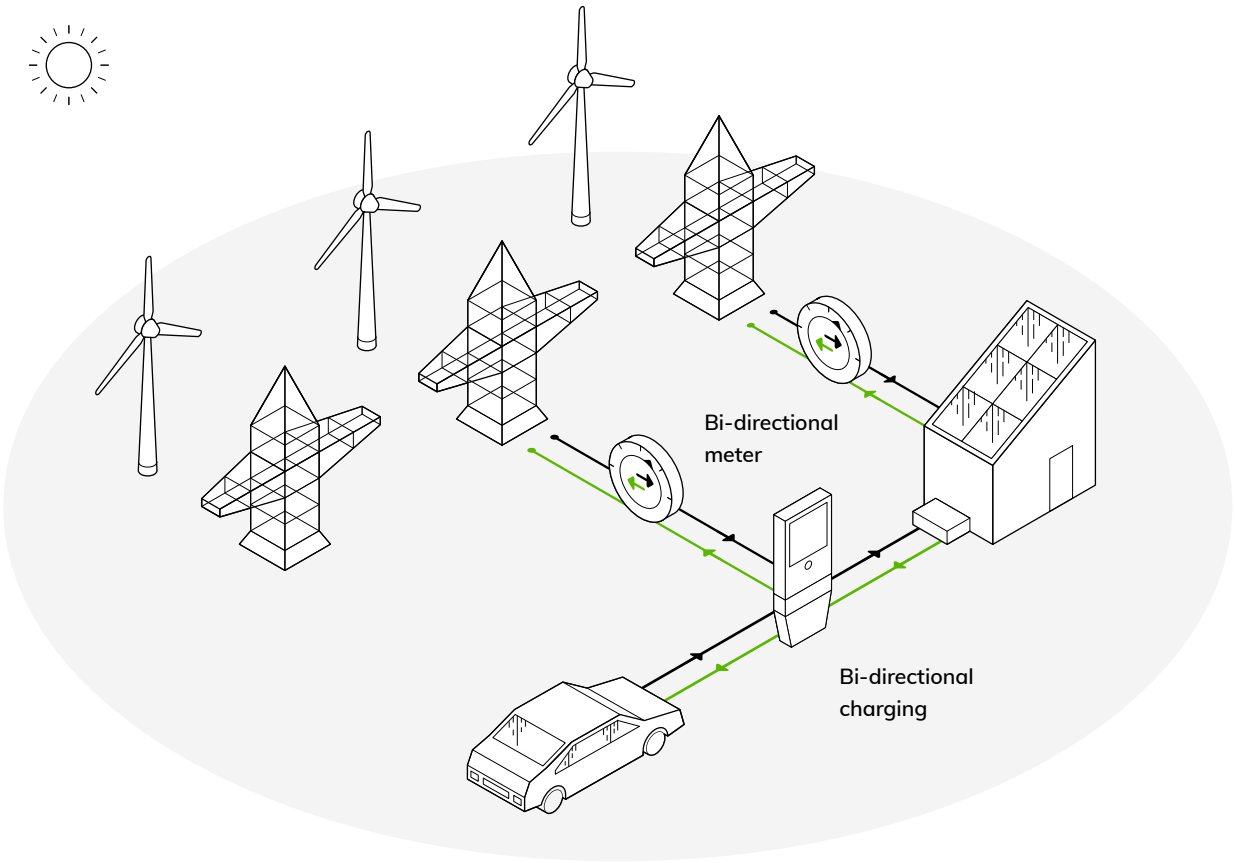

Figure 6: Electricity flow through the GEW customer tailored power box

The smart integration of EVs and HBs in the grid will change the energy landscape. Each EV and HB owner can actively contribute to the further expansion of renewable energy sources. When there is a lack of energy production, the stored energy can complement the supply and help stabilize the grid.

THE GREEN ENERGY WALLET STAKEHOLDER

- Individual Electric vehicle and home battery owners
- Energy suppliers
- Any household with solar system
- Electric vehicle fleet operators
- Car-sharing companies
- Electricity power exchange market
- Electric vehicle and home battery manufacturers
- Electric vehicle and home battery suppliers
- Insurance companies

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The GEW system can cover the world’s energy storage needs.

WHY CLIENTS WOULD CHOOSE GREEN ENERGY WALLET

- Profit on GEW token reward program.
- Charging their EV cheaper and optimize their electricity cost.
- Emergency power backup during outage.
- Useful functions in the GEW app.
- Green energy to power their homes.
- Extending battery life by managing and regulating the charge/ discharge cycles.
- Using the EV battery instead of a home battery as a supplement to their solar power.
- Making a significant contribution to environmental protection.

Three

Why we need Green Energy Wallet?

Store the overproduction of renewable energy

By 2030 growth in the renewables sector is projected with 279 GW added yearly. The challenge is the unreliability of supply and demand: overproduction of renewable energy, which can't be stored and underproduction (blackouts). The supply-demand gap can only be overcome via a reliable storage mechanism.

Low-cost energy storage

The cost of stored energy is currently very high, mainly due to the capital investments necessary for the construction of energy storage facilities. Additionally there are high maintenance costs. The advantage of GEW is that our batteries already exist. We only have to integrate them into the power grid. By using existing batteries as energy storage, there are no expensive installation and maintenance costs. Additionally, there is no need for the installation of energy storage facilities with a negative impact on the environment.

Fast-growing electric vehicle market

The EV market is growing 10 times faster than its internal combustion engine (ICE)-powered equivalent. Apart from the obvious ecological advantages, important factors such as efficiency and maintenance are driving change.

Energy trading

GEW provides battery storage capacity. The batteries will be charged at a low price of electricity and discharged at a higher price, so that GEW and the energy provider can profit from the arbitrage.

Emergency backup

Commercial and industrial facilities are investing significantly in local emergency backup infrastructures. At home, even if it is only a temporary outage, it is necessary to set up the timers again, which is usually time-consuming. GEW provides a very efficient emergency backup system. One charged EV battery can power a household for up to two weeks.

Blockchain technology

The blockchain is an emerging technology that changes the way we trade and transact with each other. It establishes peer-to-peer trading. This means energy can be transferred from one person to another without relying on a mediator, which significantly reduces fees. That will reduce fees and lack of transparency significantly and will be more resistant to manipulation or dependency on central institutions.

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> All current energy storage facilities are considerably more expensive than the use of existing evs and HBS.

Perfect combination with privat green energy production

The trend is heading towards decentralized energy production. More and more homeowners are opting for their own solar energy system. To increase the benefit to their system, a home battery is required. Instead of feeding their overproduction to the power grid for a lower price, it is much more economical to store the energy for the household’s private use or give energy back to the grid and earn NRG tokens.

Increased battery life

Uncontrolled charging reduces battery life. The GEW app controls the battery charge and discharge, which increases the lifetime of the owner’s batteries.

Important step to save our planet

More than 80 percent of human-caused CO2 emissions come from burning fossil (coal, hydrocarbon gas liquids, natural gas, and oil) for energy use, mostly for transportation, heating and electricity. The intergovernmental Panel on Climate Change estimates that a CO2 concentration of 450 parts per million (ppm) would result in a global temperature rise of 2°C. At the moment the atmospheric concentration of CO2 is increasing by about 2 ppm annually with a current overall concentration of 405 ppm. Renewable energy is the world’s best chance to avoid catastrophic climate change.

Four

Roadmap

Below you can see the GEW milestones to be achieved in a step-by-step strategy. At the moment, the GEW team is focused on the development of the GEW app and network. A GEW app test connected to a bi-directional charging station is scheduled for Q1 2018. A maximum of 30 percent of our company tokens will be offered in an ICO to investors in Q2 2018 to cover further costs associated with development, corporate growth, advertising, and production until the GEW launch in Q1 2019.

Q4 2017

- √ Specification for GEW app
- √ Market analyzes
- √ Evaluation of manufacturers
- √ Initial development of the basic functions of the GEW app
- √ Launch of the of Green Energy Wallet web page

Q1 2018
Today

- Partnership with a manufacturer from the automotive industry
- Partnership with developers of a bidirectional charging stations
- Foundation of company (according to new ICO regulations)
- Publication of the whitepaper
- Automotive industry partner provides electric vehicle for testing
- Development partner provides a bidirectional charging station
- Test basic functions of the GEW app
- Partnership with energy supplier
- Partnership with a producer for the custom GEW power box

Q2 2018

- Green Energy Wallet ICO for further financing
- Initial development together with partner of the custom GEW power box

	Application for government subsidies
	Test run for Green Energy Wallet app with full functionality
	Integration of GEW app with the Lykke Exchange and Lykke Wallet
	Development of GEW app car-sharing functions
Q4 2018	Test phase with 20 EVs, including test for car-sharing
	Launch of worldwide marketing campaign
Q1 2019	Green Energy Wallet launch in Germany and Austria
Q2 2019	Continuation of worldwide marketing campaign
	Worldwide expansion of Green Energy Wallet

Five

Green Energy Wallet revenue outlook

Trading on the energy market
Energy suppliers are buying electricity when the price is low in times of overproduction and selling it at a higher price when the power grid system needs it. GEW gets a part of these profits from the energy suppliers. As soon as the smart grid (see section 6.7.) has been expanded, GEW can profit even more from peer to peer energy trading.

Sale of market data
Statistical data regarding charging habits, mileage, services, traffic, car-sharing usage and so on, are of premium value to insurance companies, manufacturers and governments. Clients who allow us to use their data will be rewarded with NRG token.

Providing energy storage
Rather than building expensive new EES, energy suppliers can rent storage capacity from GEW.

Product selling
Our partner sells GEW customer tailored power boxes to our clients. GEW profits from sales commission.

Governmental subsidies
The GEW EES has no impact on landscape or air quality. It is paired with renewable energy. Therefore the GEW system is eligible for federal investment tax credits and governmental subsidies.

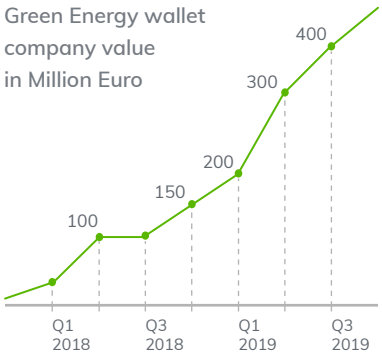

Figure 7: The GEW value rises in line with achieved milestones

Value growth of green energy wallet

The company value of GEW is expected to rise significantly after reaching each of the following milestones: GEW proof of concept, GEW ICO, GEW app integration into Lykke Wallet, GEW test phase, GEW app expansion and GEW system launch.

After launch, growth will continue with an increasing user base and international expansion. GEW will launch a strong advertising campaign. The data collected on the GEW app underpins the value of the company.

Six

Summary

CHALLENGES

- We have to reduce CO2 emission to save our planet.
- More and more EVs will replace combustion-powered vehicles, but the power grid is not yet ready for charging a high number of EVs.
- More renewable energy sources will be added to the power grid. Due to the nature of renewable energy, variations of supply and demand are steadily increasing.
- Energy has to be used at the time of production and cannot be stored in the power grid. Therefore, we need more storage for electricity.
- Today energy has to be given away almost for free at peak production and bought expensively at peak consumption.
- For future peer-to-peer energy trading, we need a smart grid. In addition, laws need to be adapted.
- The Blockchain technology need to be optimized for energy trading to guaranty decentralized trade cost-effectively and secure.

THE GREEN ENERGY WALLET SOLUTION

- GEW connects the battery storage of electric vehicles and home batteries to store renewable energy at peak production. GEW manages to provide energy back to the grid during high energy demand.
- The electricity stored in electric vehicle and home batteries can be used as a backup during power blackouts or to power private homes.
- GEW manages the charging and discharging of batteries, regulates the increasing demand for electricity, and balances the power grid by using all the opportunities of a smart grid.
- The GEW app has very useful tools for every EV owner to manage every aspect of their EV.
- GEW creates a system that rewards all participants to enforce participation in the network

THESE DEVELOPMENTS WILL INCREASE THE VALUE OF THE GEW PROJECT:

- Companies are investing billions in new battery technologies, which will increase battery capacity and reduce battery price.
- The near future of the power grid is a smart grid.
- With more renewable energy, power generation will be further decentralized.
- All major car manufacturers are announcing their shift from ICEs to EVs.
- GEW will has partnerships with car manufacturers to enable bidirectional charging of EVs.
- Blockchain technology and alternative trading venues continue to gain in prominence.

Seven

Core team and partner

JUTTA KLEINSCHMIDT

Engineering, Partnerships, Founder

Jutta Kleinschmidt is a professional car race driver and the first woman to win the overall classification at the Dakar Rally. During her race career, she developed the most successful race cars. After earning her Masters of Physics in engineering, she worked for BMW as a development engineer. She currently serves as an advisor for well-known companies.
https://www.jutta-kleinschmidt.com

ANTON GOLUB

Finance, Research, Co-Founder

Anton Golub is co-founder of Lykke. He is a leading expert in the financial applications of blockchain technology. Before Lykke, Anton worked with Richard Olsen at Olsen Ltd, a pioneer hedge fund in the field of high-frequency trading. Anton holds a Masters degree in financial mathematics from the University of Zagreb, and he is a Ph.D. candidate at the Universite de Geneve, CUI.

ALEXANDER SPULLER

Management, Business Development, Co-Founder

Alexander Spuller works as a managing engineer in his family's construction business. Over the years, he has contributed to numerous projects of various sizes and scopes, from local impact to international reach. He presently sits on the Board of Directors of Lykke. He holds a degree in civil engineering and legal studies.

CHRISTIAN SVOBODA

Management, Business Development

After finishing his studies at the Controlling Institute Austria in Vienna, Christian acted as Head of Controlling for a major food retail chain in Austria, which contributed to an extensive experience in Controlling and Finance. Since 2006, he has been the CEO and Managing Partner of a Swiss-based company that has created and managed alternative investment funds and supports various startups.

CHRISTINA MARIA ROTH

Project Management, Marketing, PR

Christina holds two Masters degrees in business. She started her career in the marketing department at Red Bull Media House and quickly progressed to overall project manager. After moving on five years later, she worked for various projects in the crypto world, and she took part in a successful ICO in late 2017.

IGOR SAMOHIN

Software development

Igor is Project Manager for Lykke's B2B projects. He has extensive experience in delivering Business Intelligence solutions to organizations and enterprises around the world and in developing long-term business relationships. His goal is to care for Lykke's partners while helping them to bring innovative products to market.

LENA MECHENKOVA

Communications

Lena is a communications professional with more than 17 years of experience in public relations and mass media. Her areas of expertise include corporate communications, internal communications, event management, change communications, writing, and public speaking.

MIHAIL NIKULIN

Technology

Mihail is Lykke co-founder and CTO and an architect and designer with 10 years of experience in creating market solutions for financial institutions, including Anti-Money Laundering, Fraud Detection, and Financial Markets Compliance solutions. He combines deep knowledge of financial architecture with blockchain technology.

SERGEY IVLIEV

Products and Operations

For 20 years, Sergey has been an industry professional, lecturer, author, and event curator. As a member of editorial boards of academic journals and expert councils, he promotes best practices of financial markets and risk management. He has supervised and completed more than 100 large-scale system implementation projects with total revenue exceeding 40 million USD. Segey is also Regional Director at PRMIA Russia and associate professor at Perm State University.

LYKKE

Technology partner

Lykke is a Swiss-based online exchange founded by Richard Olsen, former CEO of OANDA. The Lykke platform enables people from around the world to trade currencies and cryptocurrencies safely and securely. The company is helping to revolutionize finance by championing the use of digital tokens that can represent any type of asset. Lykke is also leveraging its exchange technology to build enterprise-scale solutions for large financial institutions.

https://www.lykke.com

Eight

Abbreviations

EV:	Electric vehicle
GEW:	Green Energy Wallet
EES:	Electrical energy storage
ICE:	Internal combustion engine
HB:	Home battery
BMS:	Battery management system
OBD:	On-board diagnostics
TSO:	Transmission system operators
CO2:	Carbon dioxide
OEM:	Original Equipment Manufacturer
PPM:	Parts per million
BEV:	Battery-electric vehicle
PHEV:	Plug-in hybrid electric vehicle
AC:	Alternating current
DC:	Direct current

Nine

Sourses

1. The International Energy Agency (IEA)
2. International Renewable Energy Agency (IRENA)
3. International Electrotechnical Commission (IEC)
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