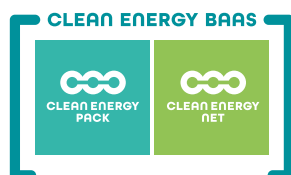


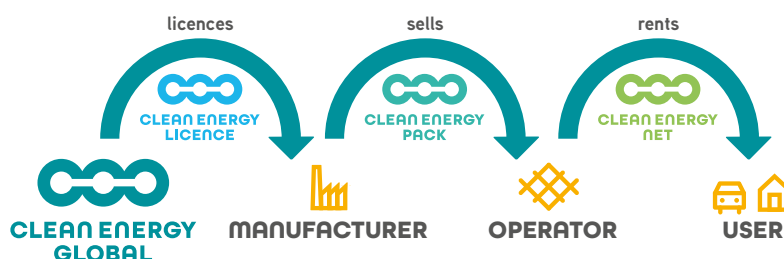


SHARE SMART BATTERIES SAFELY



BATTERY-AS-A-SERVICE – THE BUSINESS MODELL FOR ENERGY TRANSITION UND ELECTROMOBILITY

Battery-as-a-Service combines the universal battery system Clean Energy Pack and the Blockchain-secured cloud Clean Energy Net to an integrated business model. The concept “share don’t buy” applies the success formula of sharing economy and Industry 4.0 to the storage and use of sustainable energy – and promotes energy transition and electromobility.



B-A-A-S IN STATIONARY AND MOBILE APPLICATIONS

- Universal, modular battery system as scalable standard for flexible applications from 2 kWh to > 1 MWh capacity and 48 to 800 Volt tension
- Blockchain-secured connectivity of battery systems for real-time control, monitoring and billing
- Significant reduction of storing cost through reduction of battery capacity in multiple use and flexible scaling as required
- Reduction of battery system cost of through standardisation and scaling of production, operation and use through granting of licenses
- Rapid market penetration through integration of swappable battery holders in electric vehicles, appliances, machinery, stationary storage, etc.
- Stabilisation of electricity grid through battery systems in stationary applications and swapping stations as well as electric vehicles during charging
- Automatic creation of battery clusters and micro grids for the efficient distribution of energy and battery capacity between producers and consumers
- Reduction of prices of electric vehicles and electric storage by offering without batteries and renting of capacity as required
- Reduction of electric vehicle full charging time to < 1 minute in automated swapping stations for the elimination of range anxiety and charging breaks



SHARE SMART BATTERIES SAFELY



CLEAN ENERGY PACK – THE UNIVERSAL BATTERY

Clean Energy Pack is the modular, scalable and smart light-weight battery system as core element of a flexible electricity grid. The active battery management system is fully connected and can be chained up to 800 Volt

- Compact dimensions (45x37x9cm) for flexible integration in electric vehicles and stationary applications
- Low weight <25kg and connector voltage 48V allows for manual handling by users
- Combined contact, air and electric temperature management with patented cell holders reduces weight and guarantees safe operations
- Full connectivity (Bluetooth, WLAN, GSM) and plug-and-play standard for simple and flexible creation of mobile and stationary applications
- Granting of production and sales licences to battery system producers, electronics companies, suppliers etc leads to rapid scaling and optimal market penetration

APPLICATION	STATIONARY	MOBILE
Weight	< 25kg	
Dimensions	45 x 37 x 9 cm	
Cells (e.g.)	2 x 210 Panasonic NCR18650 GA	
Capacity (nom.)	5 kWh	
Capacity (net)	2 kWh (20–60%)	4 kWh (10–90%)
Cycles	~ 6.000	~1.000
€/kWh 2019	~ 0,10	~ 0,50
€/kWh 2024	~ 0,05	~ 0,25
BMS Mode	High Cycles (HC)	High Range (HR)

CLEAN ENERGY NET – THE ENERGY CLOUD

Clean Energy Net records every use of Clean Energy Packs in a Blockchain-secured cloud and provides the data to operators and users for exact billing. It also ensures safe operations and real-time monitoring.

- Permanent connection of all Clean Energy Packs with Clean Energy Net through available interfaces and use of mobile phones as modems, calculation hubs and data storage
- Operation of Clean Energy Net as proprietary application on leading cloud platforms with PC interface and mobile app
- Establishment of a rapidly scalable, open Internet of Energy (IoE) for energy producers and stationary as well as mobile consumers by connecting through Clean Energy Packs
- Upgrade of the conventional electricity grid to a smart grid through smart storage which is connected through Clean Energy Net, reducing investments and transition time
- Integration of intelligent devices with IoT (Internet of Things) connection into an intelligent electricity grid directly connected to IoT
- Establishment of local, intelligent micro grid networks through automated integration of Clean Energy Packs and sharing of electricity and storage capacity
- Securing of stable energy supply in local communities by physical distribution and direct peer-to-peer communication between energy producers and consumers through Clean Energy Packs
- Granting of operations and installations licences for Clean Energy Net to operators of Clean Energy Pack pools (e.g., energy suppliers, leasing and fleet operators)
- Own operations of Clean Energy Net as a service for licence holders, billing and roaming services