



BESS^{*} Power Plant

The disruptive
High performance-
Technology + Blockchain

* BESS (Battery Energy Storage System)

Project Hardeggen 40 MW


April, 2018

Projekt BESS Power Plant + Blockchain Technology 200 MW – Hardegsen – Alte Zementfabrik

Starting point Hardegsen

1st Stage 65 from 200 MW

Everyone's participation from 2000 EUR

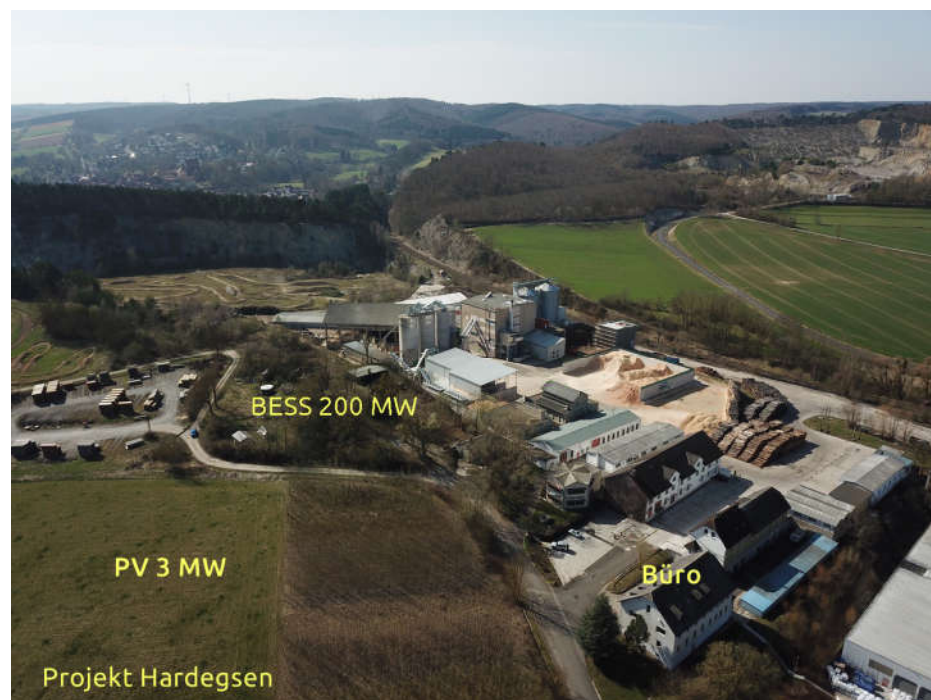
Thanks to the disruptive high-performance technology "BESS Kraftwerk™ + Blockchain Technology", anyone can participate in the value chain, right through to the end user. With the Blockchain technology creates a WIN WIN situation in the chain :

Climate, Renewable Energies (EEQ), Network, Consumers, Participants

1. Klima

Climate change is reaching alarming levels, mountain glaciers and polar ice are melting, sea levels are rising, weather extremes are on the rise, the first damage to ecosystems due to acidification of the oceans and soils has already been recorded.

The Gulf Stream loses speed, the effects are frequent heat and cold waves.



Pollution, population explosion and reckless exploitation of nature, fossil fuels and forest destruction, mass livestock farming continue to fuel climate change, with destructive effects on the biodiversity of plants and animals.

The destruction of their own livelihoods "drinking water and agricultural land" is not excluded.

2. Renewable Energy RES

The Project Hardeggen – Germany

Model and starting point of a pan-European expansion of BESS power plants for the integration of renewable energy sources EEQ and example to replace fossil and nuclear energies with RES.

Blockchain technology controls:

- Current flows in both directions
- Weather forecasts> Generation EEQ
- Offers> Submission
- Settlements



3. Netz

The network operators save the expensive network expansion which is ultimately transferred to the consumers. BESS power plants provide network services, which eliminates charges network expansion costs.

4. Consumer

Self power supply

Green electricity purchase on the open market> Leipzig/Paris - Stock Exchange



direct marketing

5. Participants - Community

Saves up to 70% electricity costs

The flow of EEQ is retrieved directly by the Blockchain in the ratio of amount of power (KW) to the amount EUR of the investment.

Self power supply*

* only applies in Germany and partly in other European countries

The BESS power plant can be divided into participant disks for self-supply, depending on the amount of the participation.

Participation in the BESS COMM

The participation in the BESS COMM is achieved with a partial ownership (disc from EUR) on a BESS power plant + Blockchain technology.

BESS power plants participate with part of their output, 70% of the reserve power market, the remaining 30% are used for the involved companies.

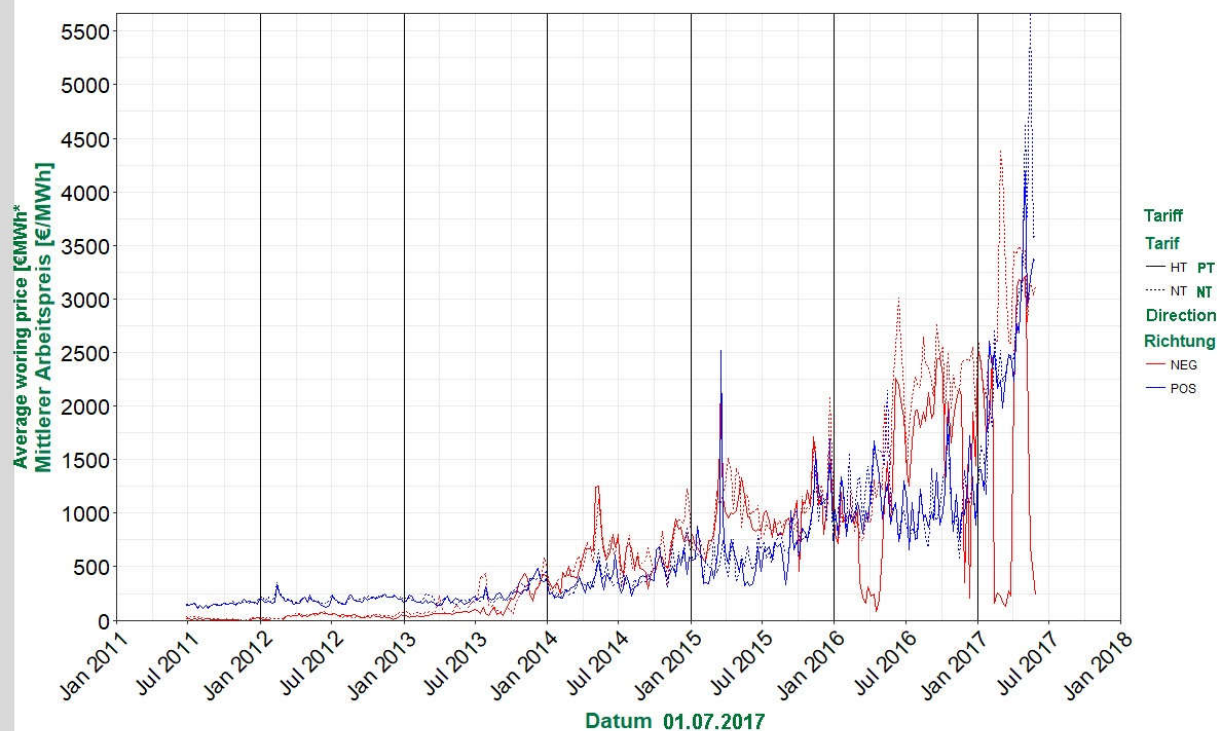
The profits generated are used to create new BESS power plants.

According to the current outlook for the reserve power market, participation will double in total every 17 months, which is 40% - 47% more in BESS Coins a year.

BESS coins are backed by BESS power plants and correspond to 1 BES = 1 EUR at the beginning of the transactions.

BESS power plant in combination with solar power is the most cost-effective power source, because these technical units have no moving, wear-prone parts.

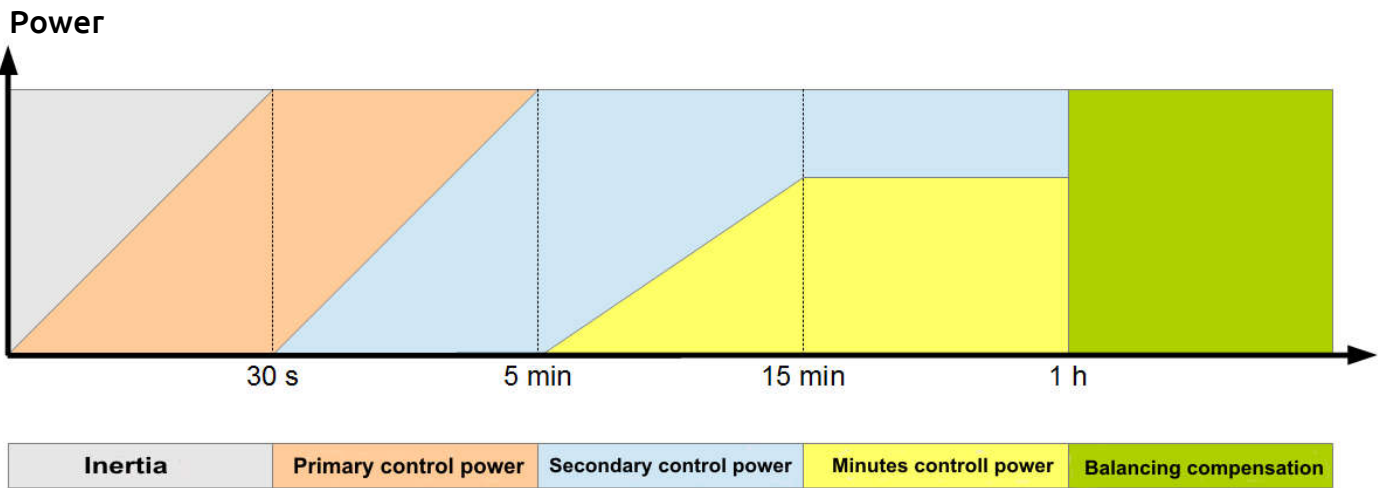
Grafik *Regeleistungsmarkt 2011 - 2017* - With an increase in EEQ price increase on average up to 25 €/cent



According to the current prospects of the reserve power market, participation will double in the total every 17 months, which is 40% - 47% profit in the year.

BESS Power Plants - The Revolution at the Control power market

Due to the inevitable inertia of the fossil technical units performing the control power, it is not possible to change them within seconds.



Due to the inertia of the reserve energy units, 3 quality levels were created, each with 5 minutes of ramp time, ramping up and down, and driving through control stations.

Automated BESS power plants, on the other hand, do not need a ramp duration, no control stations.

BESS power plants replace the 3 quality levels PRL, SRL and MRL with reaction times in milliseconds (no inertia), in which the higher quality secondary control power SRL is provided.

The minutes reserve control power (tertiary control) can be maintained with additional fluid reservoirs up to 12 hours and beyond, as required.

BESS power plants are black start capable

Renewable Energy Sources require decentralized power grids (Microgrids) created with BESS Hybrid.

The big power lines are not longer needed. The energy transition towards 100% RES can be accomplished with BESS.

Grid connection BESS Power Station

The project location 200 MW BESS Power Plant is located in the immediate vicinity of the "**Substation Hardeggen**" "Energie Netz Mitte", grid operating company, and is directly connected.



Administration

The representative office building with a large meeting room allows visitors to receive customers in a suitable environment.

Press and visitors can come here before visiting the high-performance technology Get BESS Kraftwerk plus Blockchain insights and information.



The 1000-year-old town of Hardeggen and the surrounding area with its tranquil lifestyle does not just invite you to linger. The city is an ideal center for the further development of BESS Blockchain technology. Away from industrial centers and banking towers, new ideas develop better, problems are solved faster.

The following economic calculation showed participation in the reserve power market.

Further gains in BES through direct marketing of green electricity hav'nt been taken into account.

BESS Power Plant 200 MW

ESS - Technical Containers 40'

- welded steel construction made of hollow and rolled sections acc. DIN 18800
- Double floor system for receiving electrical switchgear
- Substructure: corrosion protected, height adjustable, bolted steel construction
- Profile screw connections with the support heads in accordance with VDE 100 guideline
- Lining of floor, roof, walls according to fire protection regulations DIN 4102-

Technical description

- BESS Battery Energy Storage Power Plant 6500/7600 kW / kWh (**modularly expandable till 1 GW**) suitable for grid-parallel microgrid and island operation
- Renewable Energy Sources (RES) connectable
- Grid parallel or island operation
- Uninterruptible power supply (UPS) switchover 15/20 ms
- 3 phase
- Continuous output power 6500 kW
- Top performance 7800 kW
- AC- Tension 230/400 V
- Gridfrequenz 50/60Hz
- Power Factor $\cos \phi$ 0,90
- Certifikat CEI Norm 0-16, FNN, BDEW T.R Power plants Medium voltage network Warranty 10 years expandable by 5 years up to 20 years, lifetime 25 years

Battery storage (modular expandable)

- 16.100 LiFePO₄ Zellen 3,2 V/200AH –minVDC 567 – max. VDC 794 (2.012 BatteryPacks)
- Capacity 8093,68 kWh
- Batteries cycles 8000 at 50% DOD- max. Current throughput 7.840 h/a
- E-Container CE-compliant, Converter CEI 0-21 corresponds to VDI AR N 4105, BDEW Medium-voltage grid

Warranty 10 years expandable by 5 years up to 20 years, lifetime 25 years

Battery-Management System (BMS)

- Max. Efficiency of the battery charge controller 96%
- Nominal Voltage Batteries – 716,8 VDC
- Max. charging voltage 58,4V - Modul

Warranty 5 years, expandable by 5 years up to 20 years, lifetime 25 years

System

- Capacity storage 8093,68 kWh
- System- efficiency 92%
- Switch cabinets fireproof (dustproof) Dimensions of switching cabinets (D/W/H) 800 mm x 1400 mm x 2050 mm
- DC-AC-Switch
- Interface: CanBus, Modbus, RS-485

Grid Services

- Following network - grid stabilizing
- Controll Power (Primary- Sekundary- Tertiary reserve power)*
- Voltage support
- reactive power control
- Black start
- Load Management

Blockchain graphic card

BESS power plants are equipped with the blockchain technology. These are decentralized transaction technologies for the organization of energy systems such as transmission, metering and billing. Blockchain technology requires a constantly expanding list of datasets generated by industrial computers in BESS, plus IT- redundant's.

* <https://www.regelleistung.net/ext/>

Project: BESS (200.000kW) - BioEnergion Green Energy Ltd, 37181 Hardeggen

Economic efficiency calculation - BESS Kraftwerk (Power Plant)

Date: 05.08.2018

Performance characteristics BESS storage power plant

Continuous power	200.000 kW
Annual production	1.744.000.000 kWh
Available POS-NEG. SCP (secondary control power) availability	200.000 kW
Available for capacity	200.000 kW
Available for electricity	200.000 kW
Operation hours	8.720 h/a

Investment BESS plant

BESS power plant	286.866.000,00 €
+ transformer, mounting, commissioning	4.782.000,00 €
+ Miscellaneous (paving, etc.)	700.000,00 €
Tot Investment BESS power plant	292.348.000,00 €

Control Power (Dispatch)

Revenues from Ø performance price	37.042.560,00 €	2,124 ct/kWh
<u>Revenues from Ø electricity price</u>	<u>264.059.040,00 €</u>	15,141 ct/kWh
sub-total	301.101.600,00 €	
- Calls secondary control power (SCR)	75.275.400,00 €	25,00%
- Operation costs	31.796.608,00 €	
Ø Revenues from control power	194.029.592,00 €	

Investment amount BESS storage power plant (total)

BESS power plant - self-consumption	292.348.000,00 €
<u>Equity capital %</u>	<u>0,00%</u>
Investment amount	292.348.000,00 €

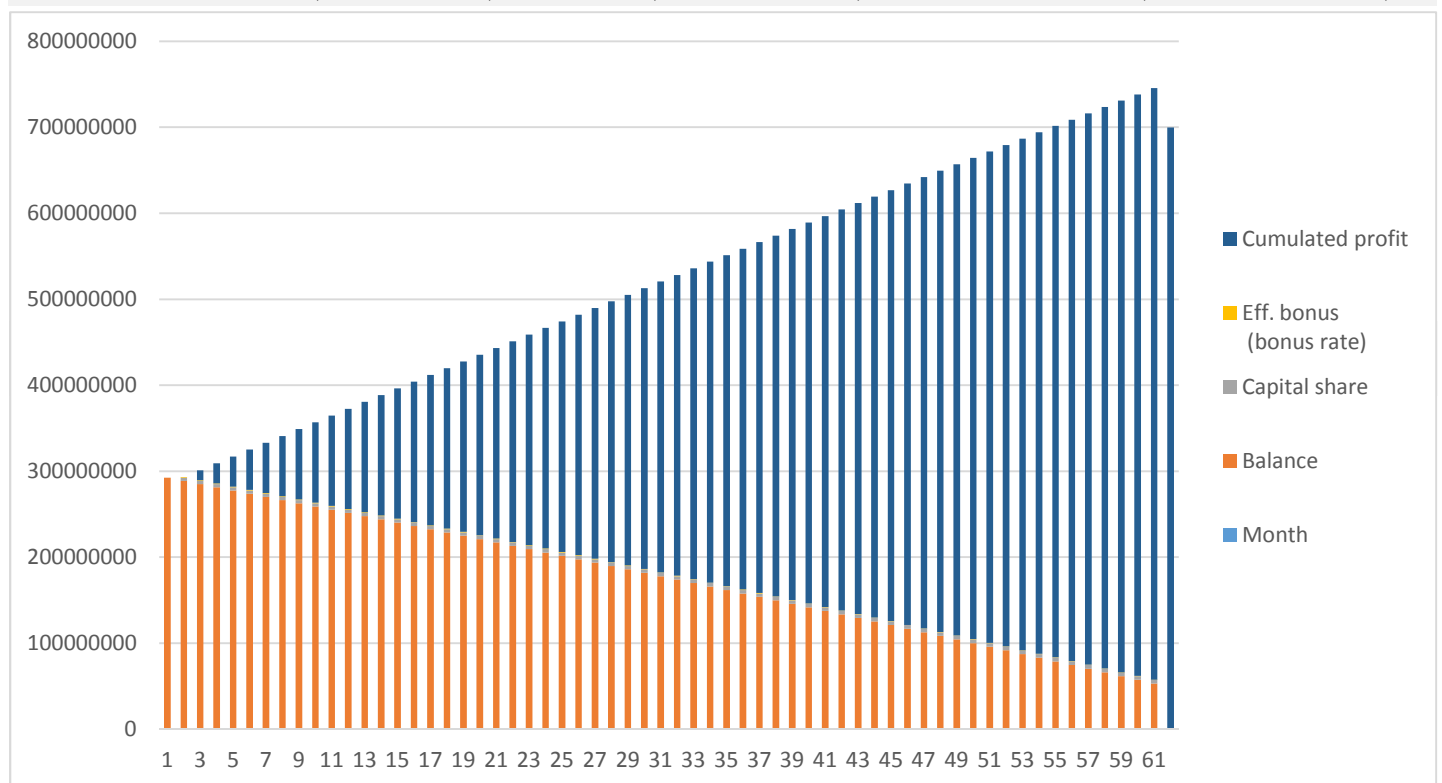
After prequalification phase 18 months

Investment amount	292.348.000,00 €	
Instalments coverage = BESS revenues	194.029.592,00 €	
Max. monthly instalment = BESS revenues	16.169.132,67 €	
Annual rate of Bonus (nominal)	3,50%	
Total Bonus	31.183.045,29 €	
Maturity after prequalification	72	7 Years and 0 Month
Monthly instalment (Bonus)	4.507.537,55 €	

Project: BESS (200.000kW) - BioEnergon Green Energy Ltd, 37181 Hardeggen
Calculation of the Amortisation

BESS Power Plant after prequalification phase						
Month	Balance	Capital share	Eff. bonus (bonus rate)	Bonus pay 3,5%	Cumulated bonus	Cumulated profit
0	292.348.000,00					
1	288.693.144,12	3.654.855,88	852.681,67	4.507.537,55	852.681,67	11.661.595,12
2	285.027.628,24	3.665.515,88	842.021,67	4.507.537,55	1.694.703,34	23.323.190,23
3	281.351.421,27	3.676.206,97	831.330,58	4.507.537,55	2.526.033,92	34.984.785,35
4	277.664.492,03	3.686.929,24	820.608,31	4.507.537,55	3.346.642,23	46.646.380,47
5	273.966.809,25	3.697.682,78	809.854,77	4.507.537,55	4.156.497,00	58.307.975,58
6	270.258.341,56	3.708.467,69	799.069,86	4.507.537,55	4.955.566,86	69.969.570,70
7	266.539.057,50	3.719.284,05	788.253,50	4.507.537,55	5.743.820,36	81.631.165,81
8	262.808.925,54	3.730.131,97	777.405,58	4.507.537,55	6.521.225,94	93.292.760,93
9	259.067.914,02	3.741.011,52	766.526,03	4.507.537,55	7.287.751,97	104.954.356,05
10	255.315.991,22	3.751.922,80	755.614,75	4.507.537,55	8.043.366,72	116.615.951,16
11	251.553.125,31	3.762.865,91	744.671,64	4.507.537,55	8.788.038,36	128.277.546,28
12	247.779.284,38	3.773.840,93	733.696,62	4.507.537,55	9.521.734,98	139.939.141,40
13	243.994.436,41	3.784.847,97	722.689,58	4.507.537,55	10.244.424,56	151.600.736,51
14	240.198.549,29	3.795.887,11	711.650,44	4.507.537,55	10.956.075,00	163.262.331,63
15	236.391.590,85	3.806.958,45	700.579,10	4.507.537,55	11.656.654,10	174.923.926,75
16	232.573.528,77	3.818.062,08	689.475,47	4.507.537,55	12.346.129,57	186.585.521,86
17	228.744.330,68	3.829.198,09	678.339,46	4.507.537,55	13.024.469,03	198.247.116,98
18	224.903.964,09	3.840.366,59	667.170,96	4.507.537,55	13.691.640,00	209.908.712,09
19	221.052.396,44	3.851.567,66	655.969,90	4.507.537,55	14.347.609,89	221.570.307,21
20	217.189.595,04	3.862.801,39	644.736,16	4.507.537,55	14.992.346,05	233.231.902,33
21	213.315.527,14	3.874.067,90	633.469,65	4.507.537,55	15.625.815,70	244.893.497,44
22	209.430.159,88	3.885.367,26	622.170,29	4.507.537,55	16.247.985,99	256.555.092,56
23	205.533.460,30	3.896.699,58	610.837,97	4.507.537,55	16.858.823,95	268.216.687,68
24	201.625.395,34	3.908.064,96	599.472,59	4.507.537,55	17.458.296,55	279.878.282,79
BEP 25	197.705.931,86	3.919.463,48	588.074,07	4.507.537,55	18.046.370,62	291.539.877,91
26	193.775.036,61	3.930.895,25	576.642,30	4.507.537,55	18.623.012,92	303.201.473,03
27	189.832.676,25	3.942.360,36	565.177,19	4.507.537,55	19.188.190,11	314.863.068,14
28	185.878.817,34	3.953.858,91	553.678,64	4.507.537,55	19.741.868,75	326.524.663,26
29	181.913.426,34	3.965.391,00	542.146,55	4.507.537,55	20.284.015,30	338.186.258,38
30	177.936.469,62	3.976.956,72	530.580,83	4.507.537,55	20.814.596,12	349.847.853,49
31	173.947.913,44	3.988.556,18	518.981,37	4.507.537,55	21.333.577,49	361.509.448,61
32	169.947.723,97	4.000.189,47	507.348,08	4.507.537,55	21.840.925,58	373.171.043,72
33	165.935.867,28	4.011.856,69	495.680,86	4.507.537,55	22.336.606,44	384.832.638,84
34	161.912.309,34	4.023.557,94	483.979,61	4.507.537,55	22.820.586,05	396.494.233,96
35	157.877.016,03	4.035.293,31	472.244,24	4.507.537,55	23.292.830,29	408.155.829,07
36	153.829.953,11	4.047.062,92	460.474,63	4.507.537,55	23.753.304,92	419.817.424,19
37	149.771.086,25	4.058.866,85	448.670,70	4.507.537,55	24.201.975,61	431.479.019,31
38	145.700.381,04	4.070.705,22	436.832,33	4.507.537,55	24.638.807,95	443.140.614,42
39	141.617.802,93	4.082.578,11	424.959,44	4.507.537,55	25.063.767,39	454.802.209,54
40	137.523.317,31	4.094.485,63	413.051,93	4.507.537,55	25.476.819,32	466.463.804,66
41	133.416.889,43	4.106.427,87	401.109,68	4.507.537,55	25.877.928,99	478.125.399,77
42	129.298.484,47	4.118.404,96	389.132,59	4.507.537,55	26.267.061,59	489.786.994,89

43	125.168.067,50	4.130.416,97	377.120,58	4.507.537,55	26.644.182,17	501.448.590,00
44	121.025.603,48	4.142.464,02	365.073,53	4.507.537,55	27.009.255,70	513.110.185,12
45	116.871.057,28	4.154.546,21	352.991,34	4.507.537,55	27.362.247,04	524.771.780,24
46	112.704.393,64	4.166.663,63	340.873,92	4.507.537,55	27.703.120,96	536.433.375,35
47	108.525.577,24	4.178.816,40	328.721,15	4.507.537,55	28.031.842,11	548.094.970,47
48	104.334.572,63	4.191.004,62	316.532,93	4.507.537,55	28.348.375,04	559.756.565,59
49	100.131.344,25	4.203.228,38	304.309,17	4.507.537,55	28.652.684,21	571.418.160,70
50	95.915.856,45	4.215.487,80	292.049,75	4.507.537,55	28.944.733,96	583.079.755,82
51	91.688.073,48	4.227.782,97	279.754,58	4.507.537,55	29.224.488,54	594.741.350,94
52	87.447.959,48	4.240.114,00	267.423,55	4.507.537,55	29.491.912,09	606.402.946,05
53	83.195.478,48	4.252.481,00	255.056,55	4.507.537,55	29.746.968,64	618.064.541,17
54	78.930.594,40	4.264.884,07	242.653,48	4.507.537,55	29.989.622,12	629.726.136,28
55	74.653.271,09	4.277.323,32	230.214,23	4.507.537,55	30.219.836,35	641.387.731,40
56	70.363.472,24	4.289.798,84	217.738,71	4.507.537,55	30.437.575,06	653.049.326,52
57	66.061.161,49	4.302.310,76	205.226,79	4.507.537,55	30.642.801,85	664.710.921,63
58	61.746.302,33	4.314.859,16	192.678,39	4.507.537,55	30.835.480,24	676.372.516,75
59	57.418.858,16	4.327.444,17	180.093,38	4.507.537,55	31.015.573,62	688.034.111,87
60	53.078.792,28	4.340.065,88	167.471,67	4.507.537,55	31.183.045,29	699.695.706,98



Cumulated profit	699.695.706,98 €	
+ Cumulated Bonus	31.183.045,29 €	
+ Repurchase by operator	146.174.000,00 €	
= Cumulated revenues	877.052.752,28 €	
./. Costs BESS power plant	292.348.000,00 €	
= PROFIT	584.704.752,28 €	
= PROFIT annual	116.940.950,46 €	40,00%

Income from reserve control power market

The calculation of profitability deliberately assumed lower revenues than could be achieved.

The remuneration of the standard benefit sometimes varies considerably. However, the trend has been picking up since the second half of 2016.

Future profits in the reserve power market can't be predicted; therefore, in the calculations we have used the mean value of the working price from the years 2015/2016 with 15.141 ct / kWh, instead of currently 41.438 ct / kWh.

The performance price (provision) was calculated with the lowest value from the years 2015/2016

- € **2,124 ct/kV**

The disruptive high-performance technology of the BESS power plants will always be awarded to the current and obsolete technical facilities in tenders, as their bids are automatically undercut due to the characteristics of the BESS power plants. Nevertheless, we deduct a 25% safety margin. The transmission system operator is obliged to award the bidder with the lowest bid.

Operating cost

- € **1,823 ct/kWh**

Regular inspections of all components for faultless function and operational safety in accordance with statutory regulations and guidelines. Operational safety in accordance with statutory regulations and guidelines.

Settlement of insurance damages

Delivery of spare parts required for fault clearance without separate charge. Spare parts are also kept in the container for this purpose.

Long-term maintenance service

Location-independent remote services (remote maintenance and remote diagnostics)

Parts Logistics

Battery storage and recycling

Operation management via BioEnergion Green Energy Ltd - Germany

- € **0,350 ct/kWh**

Settlement of balancing power with the transmission system operator.

Power Plant Investment Insurance via HDI Insurance AG

71710,97191 **7% of Invest**

Business interruption insurance incl. Loss of earnings up to 30 days with a deductible of 24 hours.

HDI Versicherungs AG has concluded a global insurance contract all in one, especially for BESS Kraftwerk.

Bonus pay rate: 3.5% annually will be pay at the end of each year, at the first time on 31.12.2019.