

# Electrical Filling Stations EFS GmbH



# Project description

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## ❖ sale of electricity for e-mobiles

- electricity is produced by renewable energy sources
- cheap electricity by buying high amount

## ❖ charging stations

- close to parking decks, cinemas, hospitals, big department stores, etc.
- with parking stations only for e-mobiles

# Market analysis

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## ❖ Establishment: Hamburg

- by now 231 e-mobiles registered in private <sup>[2]</sup>
- ambition: till 2020 about 18.000 e-mobiles owned by companies <sup>[3]</sup>

## ❖ competition

- 88 electrical-filling stations in Hamburg <sup>[4]</sup>
  - 18 – 54 €cent/kWh <sup>[5]</sup>
- Each household could be a competitor
  - 26,4 €cent/kWh <sup>[6]</sup>

# Market analysis

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## ❖ size

- 9 parking areas only for e-mobiles all over Hamburg
- one parking area for each charging station

## ❖ intended price

- Less than 25 €cent/kWh

# Market analysis

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## ❖ technical equipment

- available on the market
- with 16A or 32A rotating current (11kW or 22kW) <sup>[6]</sup>
- Energy consumption to be payed with credit card or ec-card
- average charging time up to 5 h

## ❖ agreement between our company and power provider

- provide electricity from renewable sources
- cheap industrial tariff (less than 20 €cent/kWh)

# Capacities

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- ❖ 231 electric cars are registered by private in Hamburg
  - increase 20% p.a. <sup>[2]</sup>
    - more than 1300 electric cars till 2023
  - first year 10% of the electric car drivers are using our stations (according to the charging stations proportion)
    - 23 cars
- ❖ assumption
  - 1 car drives 10000 km/a and consumes 21,5kWh/100km <sup>[7]</sup>
  - demand of 2150 kWh/a/car ➡ 1<sup>st</sup> year: 49.450 kWh
  - Yearly increase of 30%



# Investments and depreciations

Description	Amounts of investment [€]	Depreciation rate [years]	Depreciation rate [%]	Depreciation per year [€]
[8] Plot of Land	41.850	0	0	0
Additional expenses	7.400	0	0	0
<b>Sum purchase of land</b>	<b>49.250</b>	<b>0</b>	<b>0</b>	<b>0</b>
[9] <b>Charging stations</b>	<b>135.000</b>	<b>5</b>	<b>20</b>	<b>27.000</b>
[10] <b>Home charging station</b>	<b>1.000</b>	<b>10</b>	<b>10</b>	<b>100</b>
[11] <b>Electrical vehicle</b>	<b>14.000</b>	<b>5</b>	<b>20</b>	<b>2.800</b>
Laptop with equipment	1.000	4	25	250
[12] Multifunction printer	500	4	25	125
<b>Sum informatics</b>	<b>1.500</b>	<b>4</b>	<b>25</b>	<b>375</b>
[13] Office desk	600	10	10	60
[13] Office chair	500	10	10	50
Other office inventories	1.000	10	10	100
<b>Sum purchase inventory</b>	<b>2.100</b>	<b>10</b>	<b>10</b>	<b>210</b>
Tools	1.000	10	10	100
Spare Parts for charging stations	1.000	10	10	100
<b>Sum purchase extra investment</b>	<b>2.000</b>	<b>10</b>	<b>10</b>	<b>200</b>
<b>Investment</b>	<b>204.850</b>			
<b>Total depreciation rate</b>				<b>30.685</b>

# Investments and depreciations

Investment goods	Investment expenditures [€]	Depreciation rate [%]	Depreciation costs [€]
Plot of land	41.850	0	0
Charging stations	135.000	20	27.000
Home charging station	1.000	10	100
Vehicle	14.000	20	2.800
Informatics	1.500	25	375
Inventory	2.100	10	210
Extra investment	2.000	10	200
Unexpected	20.000	0	0
Circulating capital	4.000	0	0
<b>Total investment</b>	<b>221.450</b>	<b>Total depreciation costs</b>	<b>30.685</b>

<b>Total investment [€]</b>	<b>221.450</b>
40% own capital funds [€]	88.580
60% outside financing [€]	132.870



# Costs

## Consumption costs

Expendable	Specific consumption [1/kWh]	Specific price [€]
Energy (kWh)	0,16	0,16
Maintenance costs		0,0075
administrativ overhead costs		0,01
Marketing		0,005
<b>Sum of expenditures per kWh</b>		<b>0,1825</b>

### ❖ Marketing

- 50 €cent/100kWh spent to save the rain forest

## Agreement costs

Description	costs per month [€]	costs per year [€]	costs over 10 years [€]
[14] Rental office	560	6.720	67.200
[15] Internet, phone, mobile phone	500	6.000	60.000
Insurances	1.000	12.000	120.000
<b>Sum of agreements</b>	<b>2.060</b>	<b>24.720</b>	<b>247.200</b>

# Costs

## Labour costs

Personal costs	number	Personnel direct costs [€/a]
Administration	1	48.000
<b>Total of labour cost</b>		<b>48.000</b>

## Financing costs

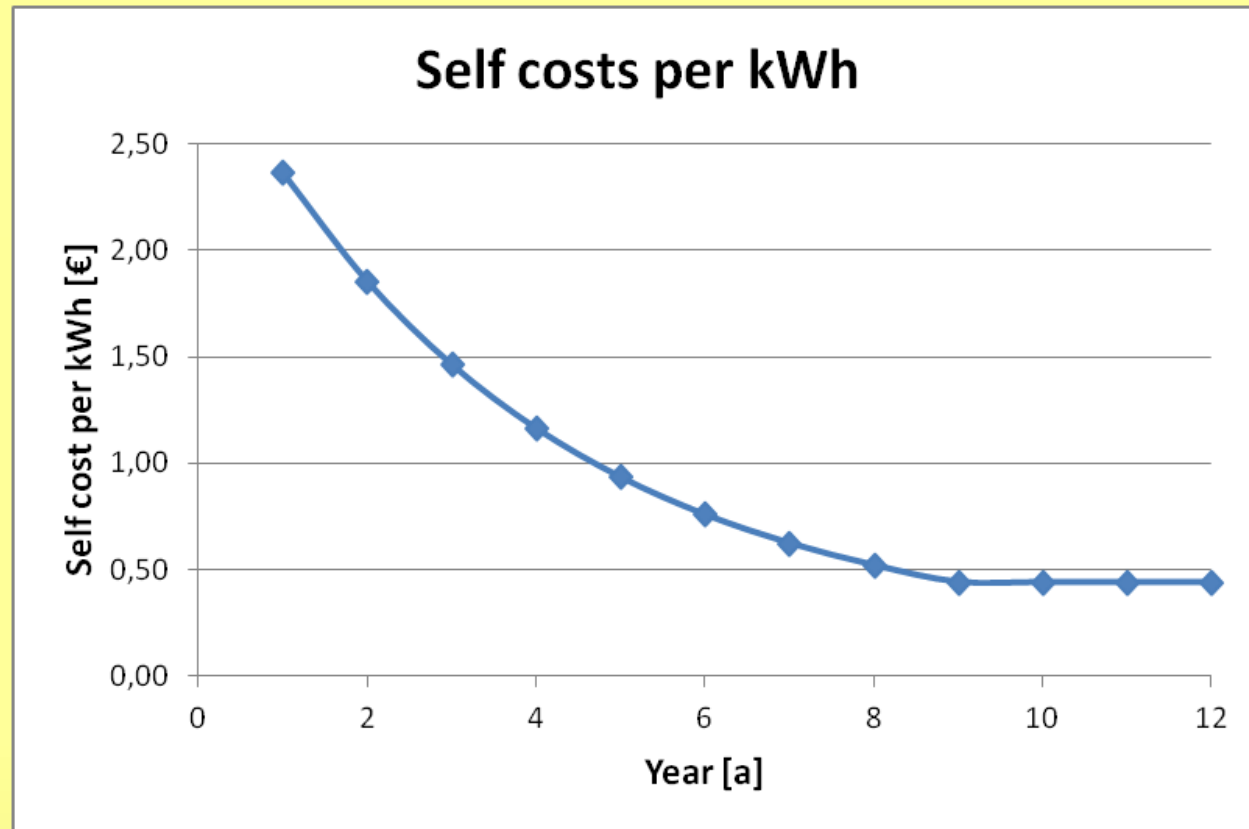
Year	Balance of debt [€]	Intrest rate [%]	Interest Costs Paid p.a. [€]	Repayment back loan p.a. [€]
1	132.870	3,5	4.650,45	13.287
2	119.583	3,5	4.185,41	13.287
3	106.296	3,5	3.720,36	13.287
4	93.009	3,5	3.255,32	13.287
5	79.722	3,5	2.790,27	13.287
6	66.435	3,5	2.325,23	13.287
7	53.148	3,5	1.860,18	13.287
8	39.861	3,5	1.395,14	13.287
9	26.574	3,5	930,09	13.287
10	13.287	3,5	465,05	13.287
<b>Total interest paid</b>			<b>25.577,48</b>	
<b>Total Repayment</b>				<b>132.870</b>

# Self costs

	1. Year per kWh	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year
Yearly increase [%]			30	30	30	30	30	30	30	30	0
Quantity sold kWh	49.450	49.450	64.285	83.571	108.642	141.234	183.604	238.686	310.291	403.379	403.379
Costs	Costs per kWh [€]	Costs per year [€]	Costs per year [€]	Costs per year [€]	Costs per year [€]	Costs per year [€]	Costs per year [€]	Costs per year [€]	Costs per year [€]	Costs per year [€]	Costs per year [€]
Depreciation costs	0,6205	30.685	30.685	30.685	30.685	30.685	30.685	30.685	30.685	30.685	30.685
Financing costs	0,0940	4.650	4.185	3.720	3.255	2.790	2.325	1.860	1.395	930	465,045
Labour costs	0,9707	48.000	48.000	48.000	48.000	48.000	48.000	48.000	48.000	48.000	48.000
Consumptions costs energie	0,1825	9.025	11.732	15.252	19.827	25.775	33.508	43.560	56.628	73.617	73.617
Agreement costs	0,4999	24.720	24.720	24.720	24.720	24.720	24.720	24.720	24.720	24.720	24.720
<b>Total of costs</b>		<b>117.080</b>	<b>119.322</b>	<b>122.377</b>	<b>126.487</b>	<b>131.971</b>	<b>139.238</b>	<b>148.825</b>	<b>161.428</b>	<b>177.952</b>	<b>177.487</b>
<b>Self costs per kWh</b>	<b>2,37</b>	<b>2,37</b>	<b>1,86</b>	<b>1,46</b>	<b>1,16</b>	<b>0,93</b>	<b>0,76</b>	<b>0,62</b>	<b>0,52</b>	<b>0,44</b>	<b>0,44</b>

- ❖ Yearly increase of 30%
- ❖ Full capacity reached after 9 years

# Self costs



- ❖ Lowest price after 9 Years with 0,44 €
- ❖ Without any new investments there is no more degradation of self costs

# Cash flow

	1. Year	2. Year	3. Year	4. Year	5. Year	6. Year	7. Year	8. Year	9. Year	10. Year
Turnover/Revenue	11.868	15.428	20.057	26.074	33.896	44.065	57.285	74.470	96.811	96.811
Depreciation costs	30.685	30.685	30.685	30.685	30.685	30.685	30.685	30.685	30.685	30.685
Labour costs	48.000	48.000	48.000	48.000	48.000	48.000	48.000	48.000	48.000	48.000
consumption costs	9.025	11.732	15.252	19.827	25.775	33.508	43.560	56.628	73.617	73.617
Financing costs	4.650	4.185	3.720	3.255	2.790	2.325	1.860	1.395	930	465
agreement costs or variable costs	24.720	24.720	24.720	24.720	24.720	24.720	24.720	24.720	24.720	24.720
Loss carries forward		-105.212	-209.106	-311.426	-411.840	-509.914	-605.087	-696.628	-783.586	-864.727
<b>Profit before tax</b>	<b>-105.212</b>	<b>-209.106</b>	<b>-311.426</b>	<b>-411.840</b>	<b>-509.914</b>	<b>-605.087</b>	<b>-696.628</b>	<b>-783.586</b>	<b>-864.727</b>	<b>-945.403</b>
Taxes (%)	40	40	40	40	40	40	40	40	40	40
<b>Profit after tax</b>	<b>-105.212</b>	<b>-209.106</b>	<b>-311.426</b>	<b>-411.840</b>	<b>-509.914</b>	<b>-605.087</b>	<b>-696.628</b>	<b>-783.586</b>	<b>-864.727</b>	<b>-945.403</b>
Cash-flow (net profit+depreciation costs)	-74.527	-178.421	-280.741	-381.155	-479.229	-574.402	-665.943	-752.901	-834.042	-914.718
Repayment credit	13.287	13.287	13.287	13.287	13.287	13.287	13.287	13.287	13.287	13.287
<b>Dividend</b>	<b>-87.814</b>	<b>-191.708</b>	<b>-294.028</b>	<b>-394.442</b>	<b>-492.516</b>	<b>-587.689</b>	<b>-679.230</b>	<b>-766.188</b>	<b>-847.329</b>	<b>-928.005</b>

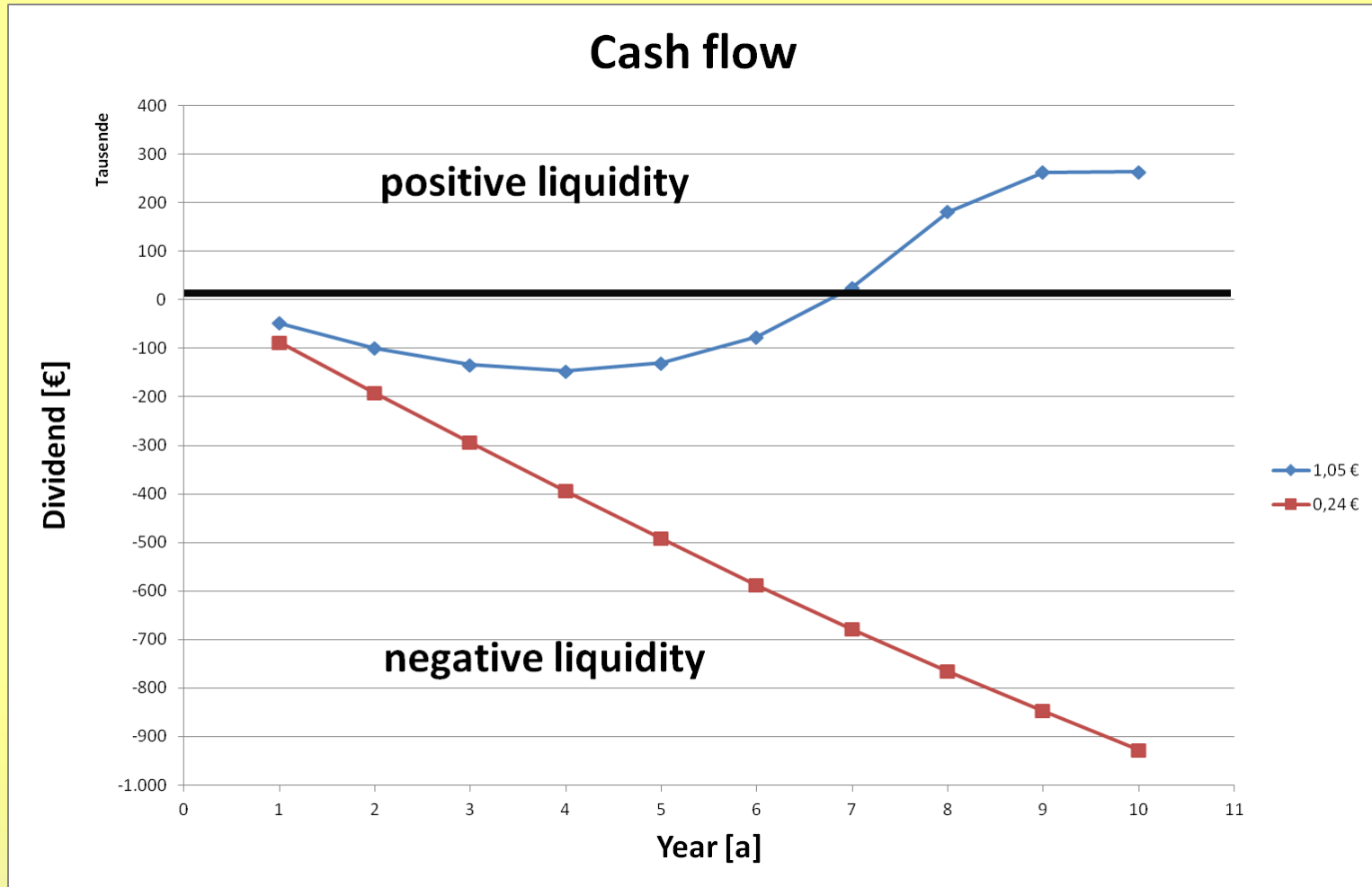
❖ Each kWh sold at a price of 0,24 € (intended price < 0,25€)

# Cash flow

	1. Year	2. Year	3. Year	4. Year	5. Year	6. Year	7. Year	8. Year	9. Year	10. Year
Turnover/Revenue	51.923	67.499	87.749	114.074	148.296	192.785	250.620	325.806	423.548	423.548
Depreciation costs	30.685	30.685	30.685	30.685	30.685	30.685	30.685	30.685	30.685	30.685
Labour costs	48.000	48.000	48.000	48.000	48.000	48.000	48.000	48.000	48.000	48.000
consumption costs	9.025	11.732	15.252	19.827	25.775	33.508	43.560	56.628	73.617	73.617
Financing costs	4.650	4.185	3.720	3.255	2.790	2.325	1.860	1.395	930	465
agreement costs or variable costs	24.720	24.720	24.720	24.720	24.720	24.720	24.720	24.720	24.720	24.720
Loss carries forward		-65.158	-116.981	-151.609	-164.022	-147.697	-94.150	0	0	0
<b>Profit before tax</b>	<b>-65.158</b>	<b>-116.981</b>	<b>-151.609</b>	<b>-164.022</b>	<b>-147.697</b>	<b>-94.150</b>	<b>7.644</b>	<b>164.378</b>	<b>245.596</b>	<b>246.061</b>
Taxes (40%)										
<b>Profit after tax</b>	<b>-65.158</b>	<b>-116.981</b>	<b>-151.609</b>	<b>-164.022</b>	<b>-147.697</b>	<b>-94.150</b>	<b>4.587</b>	<b>98.627</b>	<b>147.358</b>	<b>147.637</b>
Cash-flow (net profit+depreciation costs)	-34.473	-86.296	-120.924	-133.337	-117.012	-63.465	38.329	195.063	276.281	276.746
Repayment credit	13.287	13.287	13.287	13.287	13.287	13.287	13.287	13.287	13.287	13.287
<b>Dividend</b>	<b>-47.760</b>	<b>-99.583</b>	<b>-134.211</b>	<b>-146.624</b>	<b>-130.299</b>	<b>-76.752</b>	<b>25.042</b>	<b>181.776</b>	<b>262.994</b>	<b>263.459</b>

❖ Each kWh sold at a price of 1,05 €

# Cash flow





# Total dividend after 10 years

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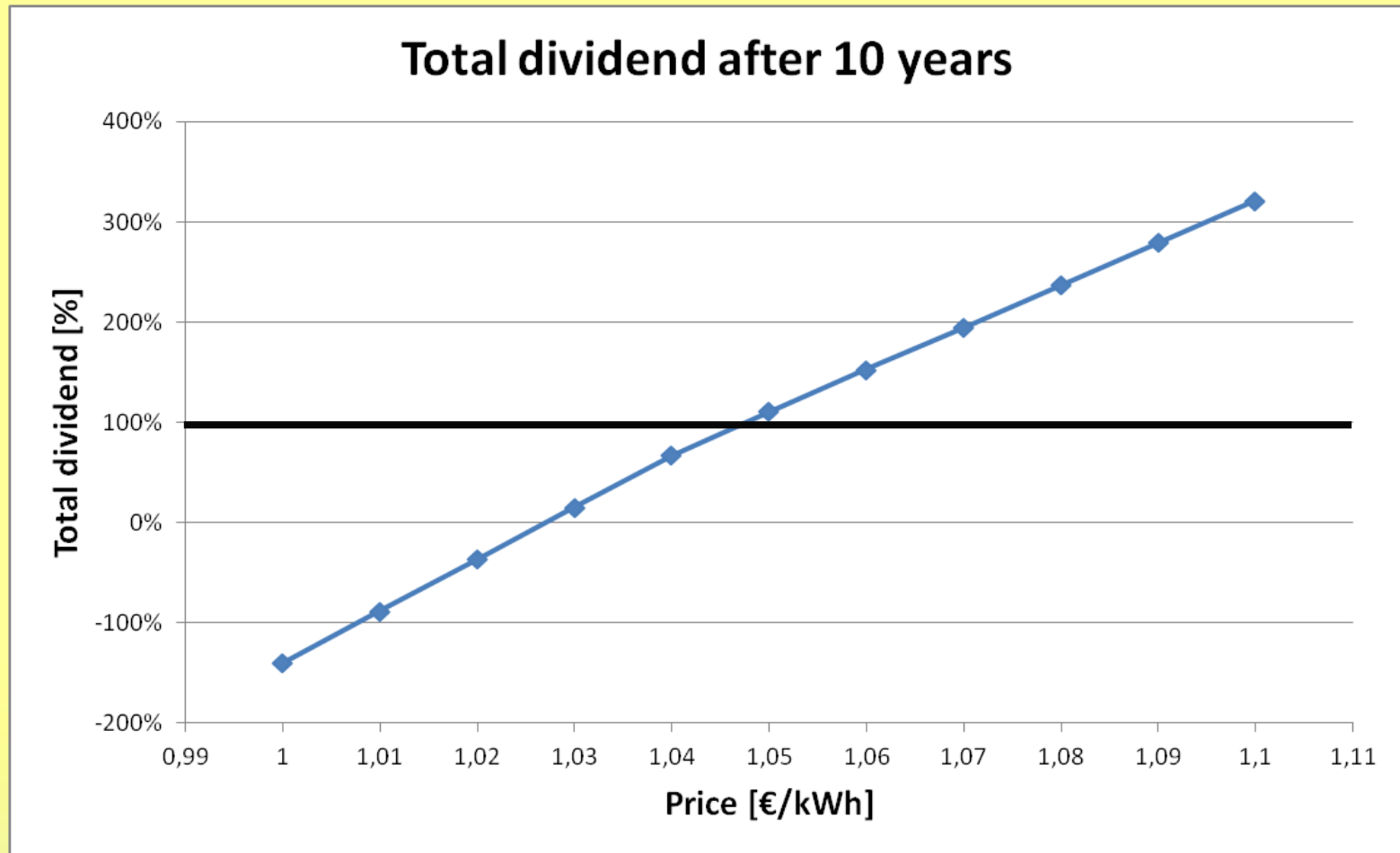
## ❖ Selling price of 0,24 €/kWh

- Total dividend: -5.268.948 €
- Interest made on equity: -5.950 %

## ❖ Selling price of 1,05 €/kWh

- Total dividend: +98.042 €
- Interest made on equity: +110,70 %

# Total dividend after 10 years



# Conclusion

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- ❖ Business is not profitable under actual conditions
- ❖ Possible solutions
  - Selling electricity at more than around 1,04 €/kWh
    - BUT: there is no liquidity in the first six years
  - Take money for time of parking without charging
  - Cheaper parking stations
  - Cheaper agreements

# List of references

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- ❖ [1] [www.erneuerbar.barnim.de](http://www.erneuerbar.barnim.de)
- ❖ [2] [www.kba.de](http://www.kba.de)
- ❖ [3] [www.hamburg.de](http://www.hamburg.de)
- ❖ [4] [www.chargemap.com](http://www.chargemap.com)
- ❖ [5] [www.goingelectric.de](http://www.goingelectric.de)
- ❖ [6] [www.wikipedia.de](http://www.wikipedia.de)
- ❖ [7] [www.adac.de](http://www.adac.de)
- ❖ [8] [www.kwassl.net](http://www.kwassl.net)
- ❖ [9] [www.derenergieblock.de](http://www.derenergieblock.de)
- ❖ [10] [www.conrad.de](http://www.conrad.de)
- ❖ [11] [www.mobile.de](http://www.mobile.de)
- ❖ [12] [www.brother.de](http://www.brother.de)
- ❖ [13] [www.inwerk-bueromoebel.de](http://www.inwerk-bueromoebel.de)
- ❖ [14] [www.immonet.de](http://www.immonet.de)
- ❖ [15] [www.telekom.de](http://www.telekom.de)