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1. Company profile

Altech Advanced Materials AG (short: AAM) is a German investment company based in Heidelberg. The company is aiming to establish itself as an investment company in the battery materials sector via the acquisition of up to a 49% direct project interest in a high purity alumina (HPA) production project. . The HPA project is held by an Australian Company – Altech Chemicals Ltd and on the initiative of AAM's major shareholder - Deutsche Balaton, the Company was made aware of the opportunity to participate in the HPA project, which comprises a kaolin quarry in Australia and a factory in Malaysia for the production of HPA from the kaolin. HPA is high-purity (99.99%) aluminium oxide. This is in great demand for processing into synthetic sapphire that is used in LED lamps and computer chips. But the material is particularly sought after by battery manufacturers. HPA is directly applied to the polymer separator sheets that sit between anode and cathode electrodes in the battery. The separators prevent battery short circuits and can increase the service life of high performance lithium-ion batteries. Experts forecast that the HPA market will slide into a supply deficit as early as next year (see chart below). And prices are also developing positively accordingly. Just two years ago, the material was traded at prices of USD27 per kilo. Meanwhile, it is understood that USD40 dollars and more is being paid in Japan for HPA. In Europe, HPA is even said to be worth a little more.

History Altech Advanced Materials AG

- **2000** Foundation of the company as "Youbisheng Green Paper"
- **2010** Production of around 150,000 tons of cardboard in the Fujian and Guangdong.
- **2011** The company is newly founded as a German stock corporation.
- **2011** IPO in the Prime Standard of the Frankfurt Stock Exchange
- **2017** Initiation of insolvent proceedings by Cologne Local Court
- **2018** Cologne Local Court revokes insolvent proceedings
- **2018** The company is restructured as an investment company
As a condition of the insolvent procedure, the assets held were auctioned off in May 2019.
- **2019** Altech Chemicals Ltd of Australia acquires 29% of the share capital of Youbisheng
- **2019** Renaming of the company to Altech Advanced Materials AG
- **2019** Altech Advanced Materials acquired the option to acquire a 49% stake in the HPA project for \$100 million. The money is to be raised among others, through a 1:40 capital increase from 1.58 to 63.1 EURm by up to 64.68 EURm. The company's share is listed in the General Standard and included in the CDAX.

2. SWOT ANALYSIS

Strengths	Weaknesses
<ul style="list-style-type: none"> • Strategic product selection: The project has not a wide range of products, but a very strategic-chosen one. LEDs & lithium-ion batteries are one of the most crucial elements in the modern world, with strong demand growth, especially in the electric vehicle industry. • Team: AAM's Board of Directors and Supervisory Board consists of very competent, well-educated and very experienced members who have been internationally active and former directors of successful companies in the chemical and mining sectors. • Future-oriented and sustainable business model: The HPA project offers, among others, environmentally friendly solutions for reducing greenhouse gas emissions and resource requirements compared to incumbent HPA producers. Therefore the company is likely to receive government subsidies and other promotional measures and thus increase its profitability 	<ul style="list-style-type: none"> • Low diversification: The company is currently very dependent on the success of the HPA project. If this does not go as planned, it would have very negative consequences for AAM. • Low brand name: Altech Advanced Materials AG has not yet established itself in the market and has neither a good reputation nor a strong brand name. • Liquidity: The reach of current liquidity depends very much on the success of the HPA project. At the current sales level, the break-even point has not yet been reached. A resilient track record is missing.
Opportunities	Risks
<ul style="list-style-type: none"> • Growth potential: The global market for high-purity alumina is expected to reach USD 7.20 billion by 2026. The company can benefit from first-mover advantages and establish itself as the European market leader. • Scalability: The future of e-mobility in Europe also depends a lot on how competent the automotive suppliers are. The HPA project has the opportunity to introduce HPA supply into an enormously growing market. 	<ul style="list-style-type: none"> • Past insolvency: In 2017, the Cologne Local Court opened insolvency proceedings against AAM. Even if the insolvency proceedings have been lifted, the creditworthiness and liquidity management of the company can still be questioned. This could result in greater difficulty in raising capital and/or higher capital costs. • Asian competition: The battery market is currently dominated by Asian companies and is likely to see the entry of many competitors over the coming years. • Non-regulated industry: The e-mobility market is not yet fully regulated, and unexpected events could have a negative impact on AAM's investment in the HPA project.

Source: Company, Dr. Kalliwoda Research GmbH © Copyright 2019

3. Capital Increase

To finance the project investment, Altech Advanced Materials (EUR 1.61; A2BPG1) has decided to increase its capital. The cash capital increase with subscription rights will take place at a ratio of 1:40 at an issue price of EUR 1.10 per share. As part of this capital increase, the Heidelberg-based company could collect up to EUR 70 million. In addition, a private placement is planned for the unissued shares, but at a price of EUR 1.20 per share.

AAM expects to place between EUR 5-10 million equity in the fourth quarter of 2019 as part of the rights issue and to place the remainder as part of the private placement in the first few months of 2020. Due to the approaching Christmas holidays, the approval of the capital increase will now be extended by three months at the Extraordinary General Meeting convened for January 15th, 2020. This should provide the necessary time to successfully implement the private placement following the rights issue. The capital increase with subscription rights, which is directed until December 16, 2019 and mainly at private investors, remains unaffected by this. In addition, the Company plans to raise further capital in 2020 through equity related products, such as a convertible bond for a further EUR 35 million.

	Number of shares	Share price	Investment for 41 shares
Before Capital Increase	1	2.50 EUR	2.50 EUR
Capital Increase	40	1.1 EUR	44 EUR
After Capital Increase	41	1.13 EUR	46.50 EUR

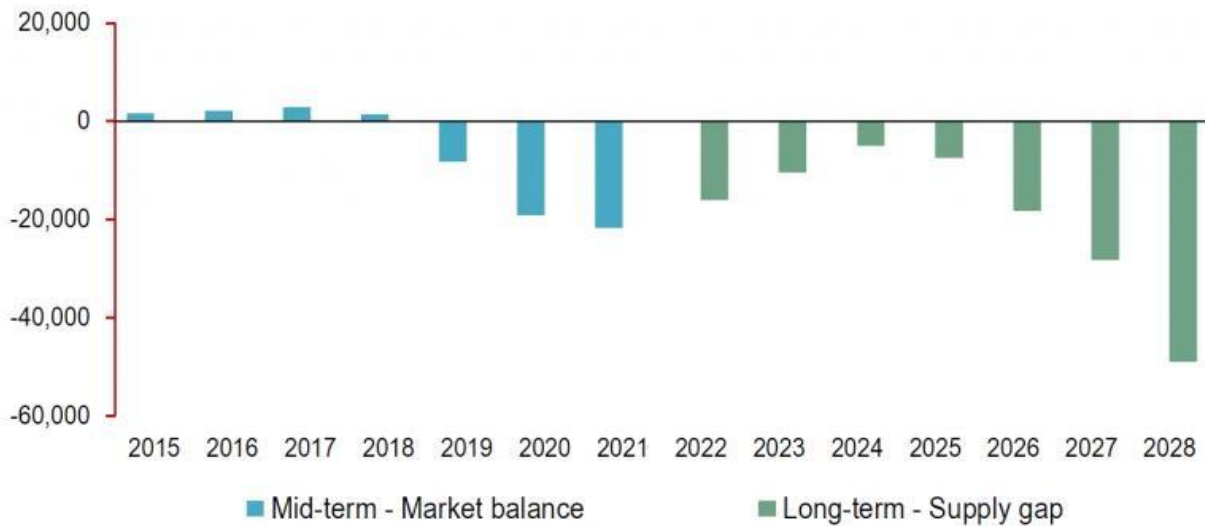
Source: Nebenwerte Journal

4. High-purity aluminum oxide (HPA)-Project

On the initiative of the German Balaton AG, Altech Advanced Materials AG wants to participate in a HPA project, consisting of a kaolin quarry in Australia and a HPA factory in Malaysia. High-purity aluminum oxide (HPA) is a high-quality, economically lucrative and highly sought-after product, as it is essential for the production of synthetic sapphire. Synthetic sapphire is used in the manufacture of substrates for LED lamps, semiconductor wafers in the electronics industry and scratch-resistant synthetic sapphire glass for wristwatches, optical windows and smartphone components. There is no substitute material for HPA in the manufacture of synthetic sapphire. However, the material is particularly sought after by battery manufacturers. HPA is used as a separator between the anode and cathode. It prevents short circuits and increases the service life of electric car batteries. It is expected that the market will already find itself in a supply deficit situation in the coming year (see chart below), which means that prices should also develop positively accordingly. Two years ago, for example, the material was traded at prices of USD 27 per kilo. Meanwhile, it is understood that USD 40 dollars and more per kilo is being paid in Japan. In Europe, HPA is even said to be worth a little more.

The large short-term deficit (blue bar) is expected to be temporarily reduced by a series of announced HPA projects in the period 2022-24, before the supply gap increases again in 2025 (green bar) and reaches around 50,000 tonnes per year by 2028:

Figure 1 CRU base case market balance and supply gap for 4N+ HPA, 2015-2028, tonnes



Quelle: investormagazin

The HPA project will use a conventional standard plant with standard equipment in its production process for the extraction of high purity alumina from kaolin using a hydrogen chloride (HCl) based method. Production costs are expected to be significantly lower than those of established HPA producers.

1. NPV before taxes US\$ 505.6 million
2. Repayment 4.5 years
3. IRR 21.9%
4. Capex US\$ 297.6 million
5. Opex US\$ 44.6
6. HPA selling price US\$ 26,90/kg
7. Profit margin US\$ 63%
8. EBITDA US\$ 75.7 million

This NPV does not originate from a valuation by Dr. Kalliwoda Research GmbH, but was valued by Altech Chemicals Ltd using internal estimates. We have taken a more conservative position and estimate the

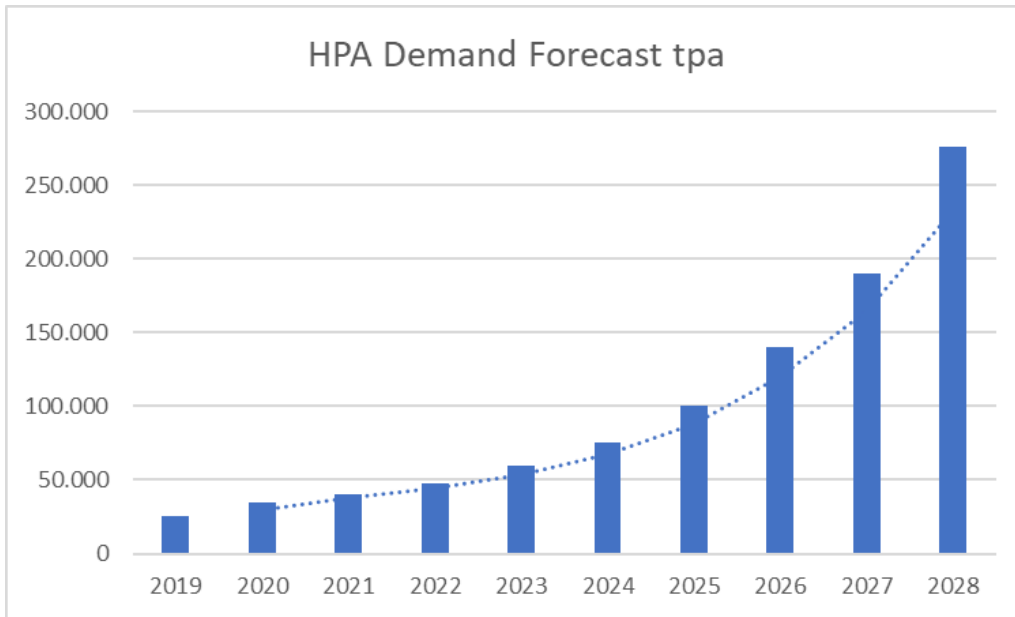
current enterprise value of AAM on the basis of a 49% stake in the HPA project at EURm 120.78 using the DCF model. Our entire valuation can be found in chapter 8 "Valuation".

„Made in Germany“ technology in Asia

Altech Advanced Materials plans to invest up to **\$100 million** to acquire a 49% interest in a HPA project that comprises a kaolin quarry in Western Australia and a HPA factory in Malaysia. The Company has signed an **option agreement** with Altech Chemicals Ltd and its wholly owned subsidiary Altech Chemicals Australia Pty Ltd which allows the Company to acquire between **10%** and **49%** of the shares in Altech's high purity Alumina ("HPA") project. The current owner, Australian company Altech Chemicals Ltd, would then own the remaining 51 percent. Iggy Tan, CEO of Altech Chemicals Ltd, also sits on the board of AAM. The goal is for first HPA product by the end of 2021, early 2022 with initial annual capacity of 3,000 metric tons per year, increasing to 4,500 metric tons per year. The factory is already under construction, Altech recently announced the completion of the first construction phase. The construction itself is being carried out by the Düsseldorf-based SMS group GmbH and its Malaysian subsidiary. SMS guarantees the quality of the HPA and also the production quantity. In addition, SMS has already acquired a stake in Altech Chemicals Ltd, which is listed on the Australian securities exchange, and SMS intends to invest further equity capital. KfW IPEX-Bank has agreed to senior debt financing, totaling USD 190 million. In addition to the use of German technology, sustainability also played an important role because the process used by Altech in the production process consumes less energy and produces no toxins, only sand and water as waste. All other chemicals are reused in the process or neutralized prior to discharge.

As a result, Altech expects HPA production costs to be low compared to incumbent producers, up to two-thirds lower than the industry's current production costs. In order to obtain the KfW IPEX-Bank loan, Altech Chemicals Ltd published a final investment decision study for the project. According to the study, the NAV at a price of USD 27 per kilo of HPA is a whopping USD 505 million. In the KfW scenario, the annual EBITDA is USD 76 million. Altech's vision is that the current HPA project will lead to the creation of further HPA plants, which would cover the company's growth and finances in the long term.

Altech is already in contact with the state government of Saxony. Prime Minister Michael Kretschmer offered the company to build the second HPA factory in his state, in the Schwarze Pumpe industrial park. This would allow another supplier from the battery sector to settle in Germany. On the one hand, the factory's NAV is well over \$100 million, which the company itself intends to use to purchase a maximum of 49 percent. On the other hand HPA prices are reported as higher today. In addition, offtake of the HPA has already agreed. Mitsubishi Australia, a subsidiary of the Japanese industrial giant, will take all HPA production at market price for the initial ten years of operation. Knowing about the forecast rising HPA demand, however, no fixed price was agreed, so that Altech can also profit from any upside in price.



Quelle: CRU Global HPA Outlook

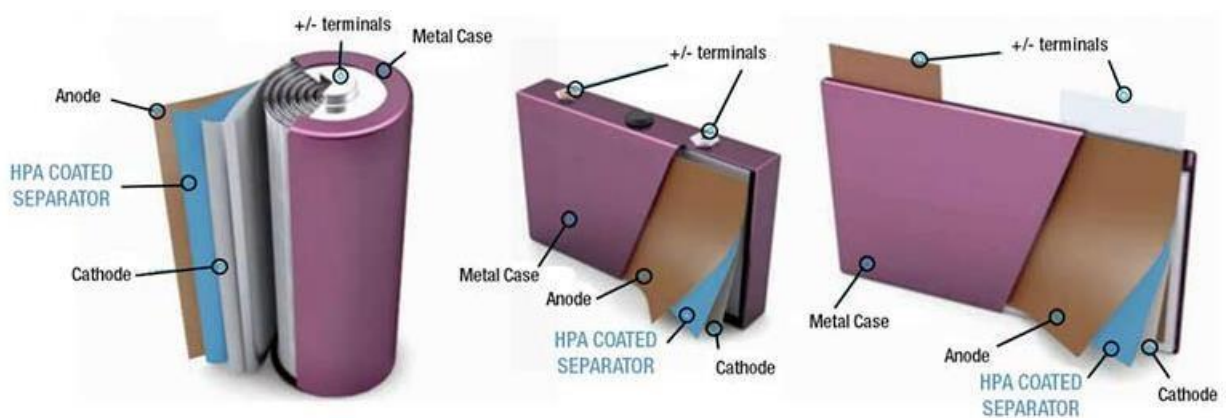
The graph shows the demand for HPA until 2028.

Manufacturers of lithium ion batteries use HPA as a coating on the separator sheets that sit between the battery's anode and cathode, a reason why the demand curve will increase as estimated and represented above.

Market experts have forecast a CAGR (= compounded annual growth rate) of HPA demand at 30% through to 2028 and that demand in 2028 will be around 272,000 tonnes p.a..

The current demand for HPA is experiencing exponential growth due to the continuous development of higher- value high-tech products such as LEDs, lithium-ion accumulators and smartphone products.

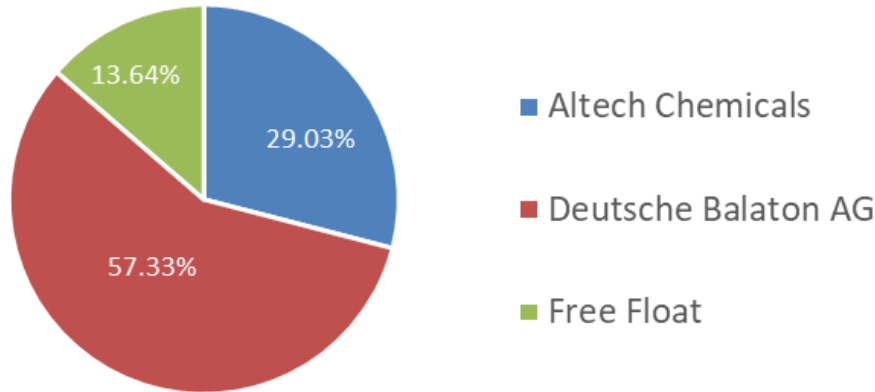
HPAs used as separator coating between anode and cathode:



Quelle: stockhead

5. Shareholders

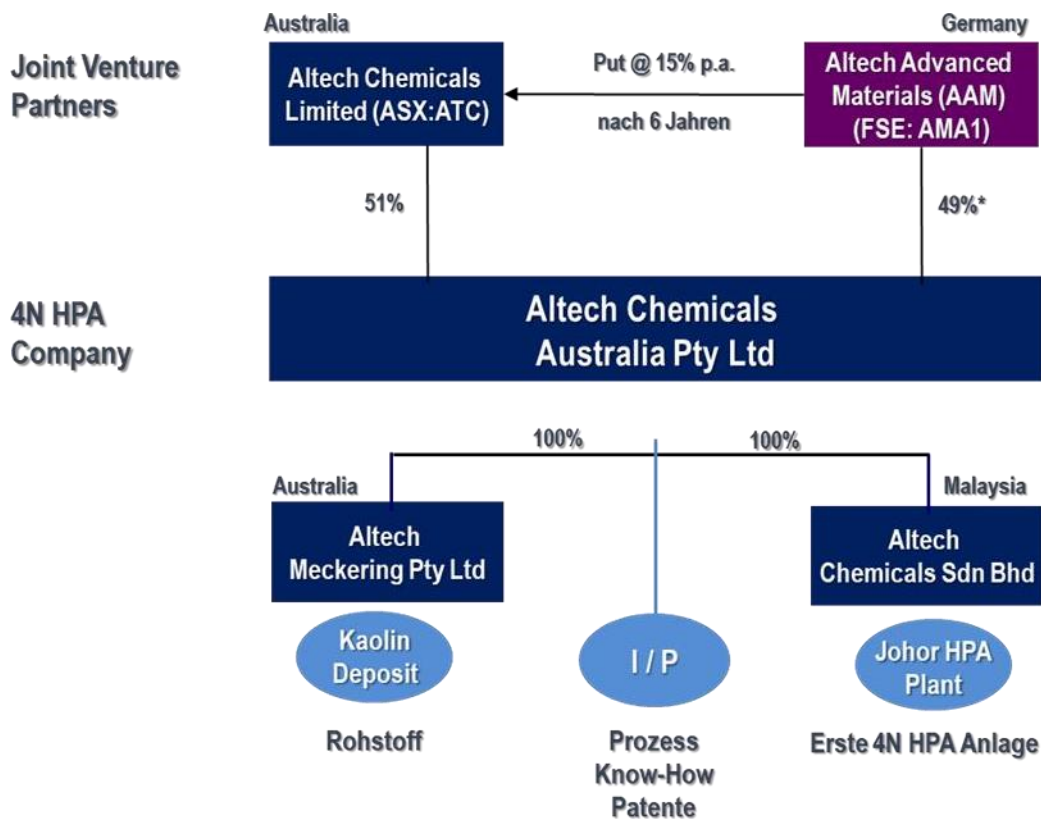
Prior to the capital increase in Q4 2019, the shareholder structure is as follows. We estimate that Deutsche Balaton AG will own slightly more than 50% of the shares after the whole funding is finished.



Quelle: Dr Kalliwoda Research GmbH

6. Company's structure

After the acquisition of 49% of Altech Australia, the corporate structure would be as following:



Quelle: AAM report H1 2019

7. Financials

Profit & Loss Statement

P&L (in TEUR)	2018	2019E	2020E	2021E	2022E	2023e	2024e	2025e	2026e
Income from securities	-	122.91	-	-	-	-	-	-	-
Other Income	123.63	139.33	-	-	-	-	-	-	118,869.16
Total sales	123.63	139.33	-	-	-	-	-	-	118,869.16
<i>Personnel</i>	(30.08)	(109.73)	(123.60)	(123.60)	(123.60)	(123.60)	(123.60)	(123.60)	(123.60)
<i>Expenses</i>	(228.52)	(4,223.23)	(300.71)	(300.71)	(300.71)	(300.71)	(300.71)	(300.71)	(300.71)
<i>Total SG&A</i>	(258.60)	(4,332.97)	(424.31)	(424.31)	(424.31)	(424.31)	(424.31)	(424.31)	(424.31)
Total Expenses	(517.20)	(8,665.94)	(848.62)	(848.62)	(848.62)	(848.62)	(848.62)	(848.62)	(848.62)
EBITDA	(134.97)	(4,193.64)	(424.31)	(424.31)	(424.31)	(424.31)	(424.31)	(424.31)	118,444.85
Depreciation current assets	(93.73)	(45.01)	-	-	-	-	-	-	-
Depreciation non-current assets	(0.00)	(28.97)	-	-	-	-	-	-	-
EBIT	(228.69)	(4,267.61)	(424.31)	(424.31)	(424.31)	(424.31)	(424.31)	(424.31)	118,444.85
Interest Income	45.81	244.16	1,813.84	484.02	364.02	244.02	120.02	-	-
Interest Expense	(3.54)	(4.76)	(2,104.76)	(2,802.38)	(2,802.38)	(2,802.38)	(2,802.38)	(2,802.38)	(2,802.38)
EBT	(186.42)	(4,028.21)	(715.23)	(2,742.67)	(2,862.67)	(2,982.67)	(3,106.67)	(3,226.69)	115,642.47
Taxes	-	2,031.00	-	-	-	-	-	-	-
Net Income	(186.42)	(4,030.24)	(715.23)	(2,742.67)	(2,862.67)	(2,982.67)	(3,106.67)	(3,226.69)	114,827.44
P/L carry forward	(497.74)	(684.16)	(4,714.40)	(5,429.63)	(8,172.30)	(11,034.97)	(14,017.63)	(17,124.30)	(20,350.99)
Balance sheet profit/loss	(684.16)	(4,714.40)	(5,429.63)	(8,172.30)	(11,034.97)	(14,017.63)	(17,124.30)	(20,350.99)	94,476.45

Source: Company, Dr. Kalliwoda Research GmbH © Copyright 2019

Balance sheet

Balance Sheet (in TEUR)	2018	2019E	2020E	2021E	2022E	2023e	2024e	2025e	2026e
Non-current assets	352,610	500.00	91,409.09	91,409.09	91,409.09	91,409.09	91,409.09	91,409.09	0.00
Altech Australia	-	500.00	91,409.09	91,409.09	91,409.09	91,409.09	91,409.09	91,409.09	0.00
Securities	352,610	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Current assets	750,209	72,235.33	15,581.56	12,838.90	9,976.23	6,993.56	3,886.89	660.20	171,896.73
Liquid Assets	239,506	3,025.67	2,281.00	738.33	875.66	892.99	886.33	660.20	171,896.73
Receivables	-	-	-	-	-	-	-	-	-
Securities Current	510,702	69,209.66	13,300.57	12,100.57	9,100.57	6,100.57	3,000.57	0.00	0.00
Other current assets	1	1	1	1	1	1	1	1	1
Total assets	1,102,819	72,735.33	106,990.65	104,247.99	101,385.32	98,402.65	95,295.98	92,069.29	171,896.73
Equity	893,394	72,585.65	71,870.42	69,127.75	66,265.08	63,282.42	60,175.75	56,949.06	171,776.50
Registered Capital	1,577,552	64,679.63	64,679.63	64,679.63	64,679.63	64,679.63	64,679.63	64,679.63	64,679.63
Capital Reserve	-	12,620.42	12,620.42	12,620.42	12,620.42	12,620.42	12,620.42	12,620.42	12,620.42
Balance Sheet P&L	(684,158)	(4,714.40)	(5,429.63)	(8,172.30)	(11,034.97)	(14,017.63)	(17,124.30)	(20,350.99)	94,476.45
Liabilities	126,876	124.89	35,105.45	35,105.45	35,105.45	35,105.45	35,105.45	35,105.45	105.45
Bond	-	-	35,000.00	35,000.00	35,000.00	35,000.00	35,000.00	35,000.00	0.00
Trade Payables	24,021	24.72	5.27	5.27	5.27	5.27	5.27	5.27	5.27
Payables DBAG	97,227	99.61	99.61	99.61	99.61	99.61	99.61	99.61	99.61
Accruals	82,549	24.79	14.79	14.79	14.79	14.79	14.79	14.79	14.79
Other liabilities	5,627	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57
Total Equity and Liabilities	1,102,819	72,735.33	106,990.65	104,247.99	101,385.32	98,402.65	95,295.98	92,069.29	171,896.73

Source: Company, Dr. Kalliwoda Research GmbH © Copyright 2019

Cash Flow Statement

Cash Flow Statement (in TEUR)	2018	2019E	2020E	2021E	2022E	2023e	2024e	2025e	2026e
Net Result	(186.42)	(4,030.24)	(715.23)	(2,742.67)	(2,862.67)	(2,982.67)	(3,106.67)	(3,226.69)	114,827.44
Depreciation Non-Current Assets	1	28.97	-	-	-	-	-	-	-
Change in Working Capital	(591.03)	(68,700.94)	55,889.65	1,200.00	3,000.00	3,000.00	3,100.00	3,000.57	-
Change in Accruals	(74.69)	(57.76)	(10.00)	-	-	-	-	-	-
Cash Flow from Operations	(852.13)	(72,759.97)	55,164.42	(1,542.67)	137.33	17.33	(6.67)	(226.12)	114,827.44
Cash Flow from Investments	(352.61)	(176.36)	(90,909.09)	-	-	-	-	-	91,409.09
Free Cash Flow	(1,204.74)	(72,936.33)	(35,744.67)	(1,542.67)	137.33	17.33	(6.67)	(226.12)	206,236.53
Change in Paid in Capital	1,281.76	63,102.08	-	-	-	-	-	-	-
Change in Capital Reserve	-	12,620.42	-	-	-	-	-	-	-
Change in Bond	-	-	35,000.00	-	-	-	-	-	(35,000.00)
Cash Flow from Financing	1,281.76	75,722.50	35,000.00	-	-	-	-	-	(35,000.00)
Change in cash	77.02	2,786.16	(744.67)	(1,542.67)	137.33	17.33	(6.67)	(226.12)	171,236.53

Source: Company, Dr. Kalliwoda Research GmbH © Copyright 2019

8. Valuation

The main difficulty in analyzing and estimating the future performance of a company without historical data is that all future forecasts are based on uncertain forecast data.

In our valuation, we have used very conservative assumptions to make our valuation realistic. The discounted cash flow (DCF) method is one of the most commonly used valuation methods in the financial sector. We have used this method to obtain a rough estimate for the business idea of Altech Advanced Materials AG.

The most conservative discount for a listed company like AMM is up to 10.74%. We have also used the long-term growth rate of 2% the terminal value.

The terminal value indicates the present value of the project based on its future cash flows with a fixed long-term growth rate of 2%. The terminal value is calculated from a flow of forecasted future free cash flows discounted by the cost of capital (10.74%).

We estimate the value for Altech Advanced Materials AG based on the discounted cash flow model at **120.78 EURm** and a fair value per share of **1.81€**. This fair value comes from the average of a NAV calculation under 2 different scenarios and the value from the DCF model.

Scenario 1: the bond of 35 EURm is repaid in full NAV/share: → **1,89€**

Scenario 2: the bond is converted to a strike of 1.5 NAV/share: → **1,67€**

Our DCF model brings a fair value per share of **1.87€**

The calculation is based on the assumption that the company will collect the entire planned equity capital from the capital increase in a ratio of 1:40, so that the number of shares after the capital increase will amount to 64.7 million.

Discounted Cash Flow Model (2019)	2019e	2020e	2021e	2022e	2023e	2024e	2025e	2026e
in TEUR								
HPA - Projekt (in TEUR based on EUR = 1.10 USD)								
Sales	-	-	-	-	99.28	119.56	124.31	119.56
EBITDA	-	-	-	-	59.22	76.91	80.08	76.00
Depreciation	-	-	-	-	(19.07)	(19.56)	(20.08)	(20.55)
Interest	-	-	-	-	(21.77)	(20.30)	(17.82)	(14.88)
EBT	-	-	-	-	18.38	37.05	42.18	40.57
Tax	-	-	-	-	-	-	-	-
Net Income	-	-	-	-	18.38	37.05	42.18	40.57
Attributable to AAM (49%)								
Cost AAM	(4.33)	(0.42)	(0.42)	(0.42)	(0.42)	(0.42)	(0.42)	(0.42)
Interest AAM	0.24	(0.29)	(2.32)	(2.44)	(2.56)	(2.68)	(2.80)	(2.80)
EBT AAM	(4.09)	(0.72)	(2.74)	(2.86)	6.02	15.05	17.44	16.65
Taxes	-	-	-	-	-	-	-	-
Net Income AAM	(4.09)	(0.72)	(2.74)	(2.86)	6.02	15.05	17.44	16.65
Free Cash Flow Estimation	-	(0.72)	(2.74)	(2.86)	6.02	15.05	17.44	16.65
WACC	10.74%							
PV of FCF's		(0.65)	(2.24)	(2.11)	4.00	9.03	9.46	8.15

Sum of FCFs	25.654
Terminal value	95.129
Growth rate	2%
Shareholder value	120,782.55
Number of shares outstanding (m)	64.68

WACC	10.74%
Equity Interest Cost	15.0%
Debt Interest Cost	8.0%
Tax Shield Debt	30.0%
Debt	45.3%

Fair value per share in EUR (today)	1.87
Fair value per share in EUR (in 12 months)	2.07

Source: Company, Dr. Kalliwoda Research GmbH © Copyright 2019

Net Asset Value calculation	2026e
in TEUR	
Registered Capital	64,679.63
Capital Reserve	12,620.42
Balance sheet profit / loss	94,476.45
Equity	171,776.50

NAV/ share 2026	2.66 €	bond repayment
	2.35 €	convertible @ strike 1,50
5% Discount rate (2026)	1.41	
Average NAV/share	1.81 €	
	1.89 €	Target with bond repay
	1.67 €	Target mit Convertible
	1.87 €	Target with DCF

It is important to emphasize on the fact that this present value represents the current enterprise value based on the forecasted revenue, cost, profit and long-term growth rate projections and the accuracy of the financial planning of the project in Malaysia. This means that the Company will only be worth this amount as long as the future projections accurately reflect reality.

The DCF model involves risks as unexpected circumstances or inaccurate estimates change the value of the company.

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