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PRIVATE EQUITY INVESTMENT COMMITTEE PAPER ON BA GLASS – DEEP DIVE ON CAPITAL STRUCTURE

Mariana de Jesus Cassiano
Neves de Calça e Pina

Work project carried out under the supervision of:

Luís Mota Duarte

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Abstract

This investment committee paper consists of an investment proposal for a leveraged buyout on BA Glass, one of the largest European manufacturers of glass packaging for the food and beverage sectors, with international presence and an extensive portfolio. The project was elaborated by students from the Master's in Finance at Nova SBE which is intended to be used for academic purposes only. The group sought to determine how to best structure an LBO acquisition of BA Glass and what returns it may deliver. Afterwards, a deep dive into four topics is made: financial modeling, valuation, capital structure, and exit strategies.

Keywords

Glass packaging producer; energy crisis; leverage buyout; trading comparables; past transactions; returns; due diligences; exit strategies

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A walk-through BA Glass investment committee paper

Founded in 1912 under the name "Barbosa e Almeida" and dedicated solely to the **commercialization of glass bottles**, BA Glass now employs over 3990 people throughout five plants in the Iberian Peninsula, one in Germany, two in Poland, and four in Southeast Europe, as well as more than 30 warehouses that promote product closeness to the client (appendix 1.1). BA Glass expansion is primarily due to the numerous acquisitions it has made in the past, particularly in the last ten years. In fact, the most recent ones occurred in 2016 with the acquisition of the German plant of Warta Glass, and the Yioula Group in 2017 consisting of four plants in south-eastern Europe (SEE): two in Bulgaria, one in Romania, and one in Greece.

The group's yearly production is over **10 Bn glass containers** (equivalent to more than 2,4 tons of glass) with distribution in more than **70 countries worldwide**. The company’s product portfolio is divided into four different categories, including Wine, Beer, Food & Others[1]. In addition, BA Glass constantly innovates its products while introducing new ones to meet the demand of its end users, namely bottlers and fillers, and to compete with fierce peers.

Even if the degree of competition in this industry is high, BA Glass can distinguish itself from its closest competitors by leveraging some **competitive advantages** based on its **capacity installed, consistent service excellence, contract terms, and product quality**. Indeed, some of BA Glass clients’ testimonials affirm that “Having BA Glass as a supplier is an advantage for [them] as it is able to deliver several different product lines, in large quantities and at different points.” or also that “Among [their] suppliers, BA is the one with the best service. [They] have never had lead-time problems with BA.”.

[1] The segment *Other* includes spirits, soft drinks, olive oil and the pure line

Regarding the company's financial position, one can say that BA Glass has shown **resilience** and has proven to be financially stable within its lifetime. When we look at how the company performed over the last five years (2017-2021), we can clearly see that it has **positively progressed**, with sales reaching their peak in 2021 (over € 1Bn). The latter was the result of two major factors: a rapid market recovery from the pandemic, and a shift in consumer behavior towards choosing glass (rather than plastic, for example).

However, not everything went as smoothly as the sales recovery. The year 2021 was marked by the possibility (later proven to be real) of war between Russia and Ukraine. This insecurity, which will be discussed further in the paper, resulted in **an increase in energy prices**, which severely impacted BA Glass's margins. In fact, **EBITDA margin fall by 10 p.p. from 2020 to 2021** (34% vs. 24%). It is important to recognize that, with the exception of rare events such as 2021, these margins are sustainable in the glass sector, owing to the industry's demand for high levels of CAPEX. The main driver of the decrease in BA Glass' margin was the increase in raw materials of 51% from 2020 to 2021, which were a reflection of both the inflationary production costs and energy prices. In response to the world's current inflation and energy crisis, BA is **investing heavily in reducing costs and increasing productive capacity** across all plants (new furnaces, digital acceleration programs, etc.). Despite the fact that the company has suffered during the past year, as mentioned before, the Group still has **enough liquidity** to face potential negative financial market movements. In fact, on the one hand, there is an overall decrease in Net Debt from 2017 to 2020 (-16% CAGR). On the other, the company's EBITDA increased (8% CAGR) over the last five years. In the end, this resulted in a Net Debt/EBITDA ratio of 1,6x, providing insurance to the company and its investors.

If we take a closer look into the company's income statement, we can infer that, while energy costs had a significant impact on the company's profits, this impact was mitigated by BA Glass' organic and inorganic strategies. To begin with, BA Glass reached € 1Bn in sales in 2021, with the Iberian division contributing the most (c. 54% in 2021), followed by SSE and Central Europe. It is worth to mention that, even though BA Glass felt the effects of Covid-19 in 2020, it **never lost its resilience as contract sales continued to grow** (appendix 2.1). If we investigate sales by segments, in 2021 Food accounted for 35% of these, followed by Beer (26%) and Wine (18%). Despite losing 5% share of sales in the past five years (2017-2021), the wine segment experienced an increase from 2020 to 2021 with the reopening of the HORECA channel. In contrast, the Beer and Food segments have clearly increased from 2017 to 2021, 18% and 17%, respectively.

One can think of sales growth coming from two fronts: organic and inorganic. On one hand, BA Glass' **revenues grew organically** over time due to investments made to diversify its portfolio and increase its plants' efficiency. On the other, BA also **grew inorganically** due to investments made to support the increasing demand and the growing number of customers, such as the integration of new plants (since 2016: acquisition of Yioula and HNG).

Regarding operating costs, the main one is related to **energy consumption**, specifically electricity and natural gas, which represents one of the largest cost drivers given that BA Glass operates in an energy-intensive industry. BA Glass has focused on continuous efficiency improvements through **product mix diversification, cost optimization, and investments in innovation and new furnace technology** to reduce these costs. Nonetheless, as it was already explained, raw material costs increased 51% from 2020 to 2021 as a result of an increase in geopolitical tensions between Russia and

the rest of Europe. Following this, supplies and external services are the second largest cost driver, increasing 9% in the past year and accounting for 22% of total operating costs.

Finally, one can infer from BA Glass' Balance Sheet that its business model requires **large PP&E investments**, which can serve as collaterals for its own financial debt. The acquisition of Yioula and HNG in 2017 required BA to raise debt and increase its PP&E by 61%. Nonetheless, over the last five years, BA Glass has **reduced its net debt by € 300M, demonstrating the company's ability to regain financial stability**. BA Glass' networking capital has been positive over the years, but in 2021 it turned negative for two reasons: (i) due to a significant **increase in trade payables**, which is explained first by both the inflation and the Russian conflict, and second by BA Glass being able to negotiate better terms with suppliers and thus increase its days in payables, and (ii) **accounts receivable remaining stable** from 2020 to 2021. As previously stated, BA Glass has a strong cash flow generation, consequently reflected in its **CCC that has been decreasing and has become negative**. As a result, while the energy crisis had an impact on BA Glass' financials, the company was able to overcome this difficult period. In addition, market trends for the glass packaging industry also indicate some level of confidence in the sector's prospects, which is also one other positive thing.

The **glass packaging industry** is gaining a lot of popularity since it is considered an attractive choice for consumers. To begin with, glass is the only **eternally recyclable** material, as well as the **healthiest** and **safest**. Furthermore, glass **can preserve food and drinks** without affecting their original features, and it **prevents dangerous compounds** from entering packaged items. These characteristics, aligned with the fact that **sustainability concerns** are emerging among customers, have made glass the best packaging solution according to 90% of consumers analyzed in a McKinsey study. That said, the global glass packaging market is forecasted to grow at **1,4% per year** until 2026,

with most regions around the globe anticipating considerable growth. Latin America, Australasia, the Middle East and Africa, and Western Europe are the regions that are primarily responsible for this significant growth (appendix 3.1). The main growth drivers responsible for this expected increase include the rising levels of concern for recyclable and sustainable packaging, as well as the decision to use glass as the preferred material for premium products across all regions as demand for premium and super-premium products is rising.

Given that **Europe accounts for 38% of the worldwide market for glass packaging** and that **BA Glass has 12 production plants** in this region, mostly in Portugal, Spain, Poland, and Bulgaria, the company is particularly well positioned in the industry. The European addressable market is made up of 99% of the segments **Food** and **Beverages**, which are projected to grow by **8,25%** and **6,78%,** respectively, through 2026. Currently, BA Glass is focused on these two segments: while Food has a growing trend of **transparency** in food packaging and **clean labeling**, and benefits from the reusability and long-term preservation characteristics, in the Beverages segment, **premiumization** trends have played a role in selecting glass packaging for various beverage categories and, internationally, the beverage sector is being driven by an increase in **alcoholic drinks** consumption and production. **Western Europe** is currently the largest market for the Food Segment, and Middle East & Africa is the region where it is predicted to develop faster in the future, with a CAGR of 3,4% in volume. Due to the presence of numerous beverage manufacturing companies, a growing population, and increased investment by the region's leading players, Asia Pacific currently has the largest market in the beverage segment, while Australasia has the highest CAGR, with a volume growth rate of 3,9% per year over the forecasted period.

Notwithstanding, BA Glass still has **opportunities to explore different markets**, particularly in the **Beauty & Personal Care** and **Pharmaceutical** divisions, the **fastest-growing segments** during the following five years. The Beauty & Personal Care segment is expected to grow at a **CAGR of 3,2% in volume**, showing growing trends due to the increasing demand from the premium cosmetics segment (especially in the skincare and color cosmetics segments), which prioritizes greater aesthetics composed by glass containers. The largest market in this segment is now Asia Pacific, while **Western Europe** is expected to have the highest **CAGR of 5,7%** over the estimated period. Technological innovations are the key trend gaining popularity in the pharmaceutical glass packaging market, expected to increase at a **CAGR of 8% in value**. While nowadays North America dominates this segment due to its technical innovation and strong demand for pharmaceutical products, Asia Pacific is anticipated to grow at the fastest rate due to its large population and rising prevalence of chronic diseases.

Although it is a competitive industry, BA Glass has been able to maintain an **outstanding market positioning** among its main peers. As one can observe in appendix 3.2, it was the only company able to increase sales in the challenging year of 2021, demonstrating its **strong resilience** to economic fluctuations. Furthermore, the company exhibits outstanding performance in the **EBITDA Margin**, being the one with the highest value in 2019 and 2020, of **32,5%** and **34,9%,** significantly higher than its competitors, and the second-best in 2021, with a margin of 24%, however, being expected that the company will be able to re-establish its historical margins.

Despite the positive market trends, as already mentioned, this industry is being affected by the substantial increase in energy costs. Both the covid-19 pandemic and the conflict with Russia triggered an energy crisis that has been felt around the globe and is of particular concern for energy-dependent industries. The pandemic in 2020 had an

influence on demand and pricing, with historic lows reached in the summer of 2020. Governments reacted strongly, and demand for practically everything began to rebound swiftly, with results being visible by the end of 2020. Energy supply was impacted by both the economic recovery and a decline in investments in the generation of some green deal-related energy. These imbalances in energy demand and supply began to have an influence on energy costs, with a steady but regular increase until the summer of 2021. Natural gas prices rose unexpectedly in the autumn due to low stock levels in Europe, geopolitical concerns with Russia, and divestment from fossil fuels and nuclear energy. The new energy price reality reached its maximum in the 4th quarter, registering € 311/MWh, a significant increase from its normal range of €40 to €60 (appendix 4.1). Nonetheless, the European Commission has put in place a plan to manage the risks associated with natural gas scarcity and price increases. Some of the European Commission's intervention activities include collecting € 140Bn in profits from energy companies who benefit from the war in Ukraine and distributing them to people and businesses with high energy costs or imposing a 10% mandated cut in energy consumption. Additionally, Europe has already been searching for a new energy supplier and in June 2022 it already imported more natural gas from the USA via ships than it did from Russia via pipeline (appendix 4.2). Following the same rational, BA Glass also had to adjust its operations. As previously mentioned, the glass packaging industry is known for being a heavy energy consumer, as natural gas is the primary energy source used in the glassmaking process. This said, BA Glass did some extra efforts in 2021 to become more energy efficient and decreased natural gas consumption per ton produced by 2%. Also, in 2021 a third photovoltaic park was built on the roof of one of its production facilities, increasing therefore BA’s capacity to produce renewable energy for self-consumption. In any case, even if it is generally challenging to make precise predictions,

Europe and the rest of the world are overall convinced that the energy crisis has reached its peak (appendix 4.3). This logically gives companies like BA Glass some confidence, since it suggests that the worst may be over. This said, it is not irrational to believe that now is the right time to make an investment in the glass packaging industry.

BA Glass' financial performance, market position, growth opportunities, M&A track record, and management team are the key factors that will lead to a **successful investment**. First of all, as previously mentioned, the company has an **exceptional financial performance**, composed by negative cash conversion cycle, a leverageable balance sheet with a large fixed asset base that can be held as collateral, and a strong and predictable cash flow generation, allowing for M&A activity. In line with its financial performance, BA has a **strong market positioning**, since it has been the leader in EBITDA Margin, is present in 7 European countries with 12 production plants, and has more than 100 years of history, having a high knowledge and expertise on the industry. Additionally, the market has **attractive potential opportunities** due to the growing demand for premium and sustainable packaging overall, and the company can explore new locations and segments, such as the pharmaceutical and the Beauty & Personal care segments, which can enable portfolio diversification, high potential growth, and higher margins. Furthermore, BA Glass has made 5 large acquisitions since 1999, focused on global expansion and margin optimization, that were **successfully integrated into the company**. Lastly, one of the company's strongest assets is its **strong management team**, constituted by a management board with high experience and deep knowledge in the glass industry, and supported by the BA Glass Academy, which trains employees to deal with new challenges of automatization and digitalization of BA processes.

Leveraging the attributes mentioned, the company still has room for value creation strategies, such as **internationalization**, **portfolio diversification**, and **operating efficiencies**, that can optimize investors' returns on this investment.

Internationalization, through **horizontal integration**, will **solidify** BA Glass' market positioning in Europe, enabling it to enter in **new locations** and to reach current clients' subsidiaries that are operating in regions where the business is not yet established. The main objective is to expand towards countries that have a **higher income** and **superior growth** prospects for the packaging market. Portfolio Diversification will enable BA Glass to explore **different market segments** and units and take advantage of the pre-established know-how, client base, and business model of the acquired company. The **Beauty & Personal Care** segment presents one of the highest CAGR for the period between 2021 and 2026, of **3,2%.** Entering in this new market would imply **higher margins** for BA Glass given that cosmetic products offer greater profitability. Due to its presence in Europe, mainly in countries where BA is not present, and to its Beauty & Personal Care segment, **Zignago has emerged as a strong candidate** to satisfy both strategies among potential targets. Zignago is a leading glass manufacturer in **Italy**, with geographical presence in France, Poland and US, which offers conventional and customized bottles for perfumery and cosmetic segment (~20% of revenues), and jars and bottles for the food and beverage segments. By purchasing Zignago, BA Glass will **increase revenues** (appendix 5.1), leverage from various **synergies**, and subsequently, lower its operating costs while strengthening its negotiation power with its suppliers (appendix 5.2). Zignago is predicted to have a significantly lower EBITDA in 2022 when compared with its historical levels, and thus a normalized EBITDA was used (an average of the years 2021 and 2022) and multiplied by a **multiple of 6.8x**, lower than the industry average due to normalization. Therefore, Zignago will be purchased for **€ 717M**.

Although BA Glass has managed to constantly become more efficient within the last years, having a continuous decrease in energy consumption, which represents 44% of BA production costs, there are still operational improvements the company can make. Since one ton of cullet consumes less energy than one ton of virgin raw material glass, the company aims to have the maximum cullet utilization ratio feasible. By **vertically integrating a glass recycler**, BA will secure a premium source of **cullet supply**, a scarce commodity in this industry. Among the potential targets, **Eurovetro has shown to be a strong candidate**. First off, Eurovetro is present in Italy, one of the countries in Europe that is now facing the most legislative pressure to create a circular economy. As a result, Italy's packaged glass recycling rate is greater than the average for Europe (79% vs. 75%). Also, in addition to its installed yearly capacity of 550k tons, Eurovetro is also strategically well-positioned to supply the proposed purchase, Zignago. As a North Italian glass recycler that does on-site pick-ups, collects, sorts, and processes glass waste, Eurovetro will be acquired for **€ 37M** (entry multiple of 7.3x) and will enable superior cullet supply in terms of quantity and quality. This will, in turn, represent significant **raw materials cost savings**, since cullet costs **decrease by 8%** through vertical sourcing (appendix 5.3) and higher utilization rate of cullet **reduces energy expenses** (appendix 5.4).

Several assumptions were made to build the business model for our investment committee paper. As we all know, the main issue during the development of this paper was the energy crisis because it was believed that it would have a significant impact on our analysis - which will be further detailed later in the financial modeling chapter. As a result, in addition to using Bloomberg’s predictions, we decided to estimate three different case scenarios: the pessimistic scenario, the base scenario - the one we believe is most likely to occur, and finally the optimistic scenario - the one in which the war ends

by 2024 and thus has no long-term impact on the financials. This being said, one can be more confident about the results found since the analysis considers three different case scenarios. In each one of these scenarios, four distinct variables will change, which will also impact the EBITDA margins of our work: revenue growth rate, client's price sensitiveness, natural gas prices, and level of synergies – which will be further detailed in our analysis.

Other assumptions had to be made during our research – cullet usage rate and cullet price are two examples. After making all the required assumptions that may have an impact on our study and after considering the next five years for BA Glass, we began to evaluate the company.

Several methods were used to evaluate BA Glass to the greatest extent possible. The first employed technique was looking at **trading comparables**, which required a selection of companies with similar profiles to BA (the *Peer Group*). The companies picked were O-I Glass, Vidrala, Vetropack, Gerresheimer AG and Vitro. Using platforms like Bloomberg and Reuters, it was possible to examine each of these companies in terms of both enterprise value to EBITDA and price to earnings ratios (current and from the previous ten years). Continuously, **past transactions** within the glass packaging industry were also considered. All these transactions took place between 2015 and 2020 and some even include BA Glass and its closest peers, either as the target or as the acquirer (appendix 6.1). Additionally, a **discounted cash flow (DCF) method** was also performed, considering (1) BA Glass' expected future cash flows; (2) a weighted average cost of capital and (3) a growth rate. At the end, all the multiples were studied but only those matching the most perfectionist approaches were chosen, yielding an **average of 7,3x** by the examination of the peer group's EV/EBITDA ratios (current and last 10 years),

as well as prior transactions. A multiple of 7,3x corresponds to an **enterprise value of € 2,4Bn for BA Glass.**

To invest in BA Glass, the proposed structure is to do it by using a **mix of debt and equity**. In fact, a leverage buyout model was designed, where the investor will leverage enough debt to buy not only BA Glass but Zignago Vetro too. Given the circumstances in which the glass industry finds itself (in a recession, as a result of the energy crisis), BA Glass will be acquired following **a payment structure** that includes **60% of adjusted EBITDA in 2021**, **20% of EBITDA in 2022**, and **20% of EBITDA in 2023**. This way and considering that 60% of the value is based on an adjusted EBITDA, 40% of the payment is dependent on future performance in order to avoid overvaluation, which could significantly harm investors.

In the end, uses of funds will amount to c. **€ 3,1Bn**, which corresponds to (1) the acquisition of BA Glass for € 2,3Bn (~68%); (2) the acquisition of Zignago for € 717M (~23%) and (3) the remaining 9% will be used to pay fees and the extra funds requested to cover first-years interest costs, which are € 333M. Considering the investments needed and the free cash flow generation in the future, the capital structure of the company will be composed by **56% of debt and 44% of equity**. As can be seen in appendix 6.2, ordinary equity is assumed to be 0,5x EBITDA, which represents 6% of total sources. In order to align incentives, the management team will invest € 14M, which corresponds to 10% of the ordinary equity, while institutional investors will contribute with the rest. Finally, the remaining amount that is needed will be allocated to the subordinated loan, which has a hurdle rate of 8%.

From the 56% that is financed with debt, **44% is allocated to senior debt and the remaining to subordinated debt**. Term Loan B and C have both bullet payments, have terms of 6 and 7 years respectively, and correspond to 1,5x and 2,0x BA Glass EBITDA.

The mezzanine, in turn, also has a bullet payment, a term of 10 years and corresponds to 1,0x BA Glass EBITDA. Then, term loans D and E will be leveraged in 2022 to pay for Zignago. Term loan D has amortization payments and a maturity of 5 years, and term loan E has a bullet payment and a maturity of 6 years (appendix 6.3). The interest rates of the credit lines correspond to the yields of corporate bonds with a **BBB rating,** depending in each maturity. The credit rating assigned for the purpose of this project was determined using the internal rating employed by one of the major Portuguese credit institutions, with whom BA Glass has a long-standing relationship.

Five years after first initiating the investment, **in 2026, the exit will take place**. Assuming an exit multiple equal to the entry one (7,3x), the company's EV at exit will be equal to **€ 5,1Bn** (EBITDA '26 = € 0,7Bn). After the repayment of all the debt, the company will have an **Equity Value of € 4,1Bn** to distribute among investors.

The total equity value generation of **€ 3Bn** from '21 to '26 is divided into four different components (see appendix 7.1):

(1) **Revenue Growth** of c. € 1,0Bn that generates value surplus of 33% in relation to the total equity value creation. This driver is divided between the organic and inorganic growth representing each of them 78% and 22% respectively.

(2) **EBITDA Margin Expansion** of c. € 1,2Bn (including synergies), leading to 38% of total equity value creation.

(3) **Deleverage** of c. € 760M achieved by high cash generation contributes for 25% of total equity value creation

(4) **Multiple Arbitrage** is attained through the acquisition of Zignago with a multiple lower than BA Glass (6.8x vs. 7.3x), representing 3% of total equity value generation

The proceeds of € 4,1Bn are distributed among (a) institutional investors and (b) the management team in the following structure:

(a) In 2021 and 2022, institutional investors **invested € 1,4Bn**, which will be multiplied by **2,8x** five years later (in 2026), resulting in proceeds of **€ 3,8Bn** and an **IRR 24,2%.**

(b) Management will see its **investment of € 14M** be multiplied by **15,9x** five years later, resulting in proceeds of **€ 228M** and an **IRR of 73,9%**

The results of a sensitivity analysis performed with the entry and exit multiples as inputs are generally encouraging. In fact, even in a more pessimist scenario, with an entry multiple of **8,3x** and an exit multiple of **6,3x,** institutional investors are expected to multiply its investment by **2,02x**, representing an **IRR of 15,8%.** In opposition, in the best scenario where the entry multiple is **6,3x** and the exit multiple is **8,3x**, institutional investors are expected to multiply its investment by **4,0x**, representing an **IRR of 34,2%.** These findings demonstrate the significant certainty of favourable returns when investing in BA Glass.

Notwithstanding, it is essential to evaluate the latter without the forecasted horizontal integration of Zignago Vetro. In fact, through the acquisition returns analysis (appendix 7.2), one can see that for the institutional investors, the acquisition of Zignago contributes to an increase of **3 p.p of IRR** and an increase in money multiple of **0,24x** over the holding period. For the management team, this acquisition allows managers to increase IRR from **59%** to **74%** and money multiple from **10,09x to 15,93x.** This analysis confirms that Zignago contributes positively to returns and to the equity value creation of the company. Nevertheless, it is important to note that the returns are also quite favorable

organically, with the investment allowing for an IRR of 21% and a MM of 2.57x for investors without the need of acquisitions.

In addition, the impact that each of the four assumptions considered on the business plan have on the investors' IRR was assessed (appendix 7.3). This analysis concluded that **revenue growth** and **natural gas prices** are the most critical assumptions to evaluate in the Due Diligence process due to its high negative impact on the IRR.

Before completing the transaction, BA Glass must go through a process that will involve risk and compliance check. There are at three main areas of concern: overestimation of revenues, natural gas costs and finally access to cullet. Besides that, other risks need to be taken into consideration such as legal and operational risks.

To begin with the **overestimation of revenues** – since it has a large impact on estimated returns a more in-depth analysis of the end-market price and volume should be conducted, i.e., *ReD Associates* studies customers' behavior and how it relates to a company's sales. Aside from that, an assessment of Zignago's contracts with its clients should be performed in order to quantify precisely Zignago's contribution to BA Glass' sales, as well as the possible challenges posed by new competitors in Zignago's territory.

Secondly, the concern about **the natural gas costs**; BA Glass most dependent and expensive resource is natural gas. Given the inherent volatility of gas prices, BA Glass' ability to become less dependent on natural gas should be considered. In fact, we should investigate the implications of the pessimistic scenario, the additional CAPEX needed (I.e., additional hybrid furnaces and photovoltaic parks) to counter it, as well as necessary hedging strategies. The underestimation of CAPEX needs and potential fines arising from BA Glass emissions being above the expected are two concerns that are also presented in the **operational** and **legal** due diligences, respectively. To mitigate the risks mentioned previously, one should deeply analyze CAPEX regarding the rebuilding of furnaces and

product development, as well as keeping a close eye on potential changes regarding CO_2 emissions allowances in Europe.

Lastly, the concern about the **access to cullet**, which is an asset for BA Glass since production using recycled glass reduces the need for natural gas. Natural gas price, as stated above, is quite volatile and therefore the possibility of an additional cullet plant should be investigated. Furthermore, since cullet is a commodity, in addition to studying the impact of additional cullet treatment facilities, the sensitivity of cullet to price changes should also be studied.

After determining how to best structure an LBO acquisition of BA Glass and what returns it may deliver, as well as the most critical areas of concern before finishing the transaction, it was necessary to study **BA Glass' exit options.** In fact, several exit strategies were considered, but only three were chosen to further being developed: **strategic sale, secondary buyout, and IPO.**

To begin, the **secondary buyout** would involve selling BA Glass to a Private Equity firm. This is typically a less risky and faster method of completing the transaction, which may result in faster liquidity. This type of transaction allows the company to avoid the regulatory requirements that come with an initial public offering (IPO). Furthermore, given the increasing PE activity in 2021 (AUM of $ 6.3Tn) and prior transactions demonstrating PEs' significant interest in the glass packaging business, there are few expected challenges in locating possible financial buyers. Indeed, **Sun Capital Partners** and **CVC** are two potential secondary buyers as both have previously expressed interest in investing in glass packaging manufacturing companies. For instance, in December 2019 Sun Capital Partners acquired Allied Glass company through an LBO and in 2017 CVC participated with BA Glass in the Anchor Glass acquisition.

In addition, there is also the possibility of **exiting through a trade sale**. This would imply selling BA Glass to a strategic buyer, usually included in the target's industry. Since M&A transactions are significantly common in the glass packaging industry, a strategic sale is usually the most common way of exit. Furthermore, the acquirer would also benefit from synergies created by BA Glass' acquisition. However, given the excessive industry concentration, one should be aware of potential red flags raised by competition authorities. To conclude**, Verallia** and **Ardagh Group** are the two potential buyers for this strategic sale, as both would greatly benefit from a consolidation of their current positions in the Eastern European market. For instance, Verallia recently bought Allied Glass from Sun Capital Partners private equity firm.

Finally, BA Glass could also be sold **through an IPO**. The latter implies that BA Glass shares would be sold and traded publicly. In order to do so, it is expected the company to be listed on the American stock exchange **Nasdaq.** Since BA Glass intends to expand globally, this market was chosen over the Portuguese market (PSI 20). Furthermore, this decision allows the company to reach a broader range of investors (size of US stock market vs size of Portuguese stock market), as well as serve as an advertisement for the company, which improves its credibility. Although this strategy has several advantages for BA Glass (e.g., increased investor exposure, increased company prestige and credibility), it has also a higher degree of return uncertainty because it is dependent on market conditions.

Considering everything previously mentioned, from the three exit options discussed, both **the secondary buyout and the strategic sale appear to be preferable** when compared to an IPO, with the strategic buyer representing a potentially higher exit price.

Deep dive on capital structure

An **LBO Model** is a financial tool created to assess a leveraged buyout transaction, in order to give investors the tools they need to evaluate the transaction correctly and generate the greatest potential risk-adjusted **internal rate of return (IRR)** and **money multiple (MM)**. The buyer's objective in an LBO is to maximize future profits while generating high returns on their equity investment. Calculating the estimated IRR helps the acquiring company decide if an investment is worth making. The LBO model begins with a **"sources and uses"** table before estimating the target's cash flows and leverage in the deal. Simply said, sources refer to the way by which private equity companies fund a transaction, a combination of debt and sponsor equity, and the uses for which they are purpose to: to purchase the target company, pay legal and due diligence fees, among others.

In this specific case, the **sources** will be used to acquire BA Glass, Zignago Vetro, pay for fees, and provide an overfunding to the company. The acquisition of BA Glass will be based on a **payment plan** that consists of a **fixed** and **variable** component, determined by the company's performance in 2022 and 2023. This strategy was devised in order to account for the world's current economic situation without lowering the deal's multiple (**7,3x**). In 2021, 60% of the EV is paid, with an EBITDA adjusted for the war and at historical levels of gas prices. The remaining 40% of the acquisition is divided between 2022 and 2023 based on each annual real EBITDA. Applying this payment plan, BA Glass will be acquired for **€ ~2,1B** (67% of total uses) which when divided by the defined multiple of 7,3x yields a theoretical EBITDA of € 288M, the latter of which will be used to define the LBO's sources and uses. Zignago will be acquired based on an adjusted industry multiple of 6,8x, and an adjusted EBITDA to the war impact, leading to an enterprise value of **€ 717M** (23% of total uses). The company will also ask investors

for an overfunding in order to pay for the interests of the first two years, which accounts for **€ 159M** for BA and **€ 30M** for Zignago (6,1% of total uses), and the banking, advisory and legal fees, that totals **€ 68M** for BA and **€ 23M** for Zignago (2,9% of total uses). Altogether, the company will need an amount of **€ 3,1B** that will be sourced with a combination of debt and equity.

These uses will be funded using **debt** and **equity**. The main **advantages** of financing an investment with debt include being able to deduct the interest paid from taxes, which lowers taxable income and consequently lowers taxes, it facilitates financial planning, since one is aware of the exact amount of principal and interest it will have to repay each month, which can work as a managerial incentive, and one of the main factors is that investors' returns are maximized, the main driver for private equity's financials decisions. However, there are some **drawbacks** one should also consider as the risk of having a bad credit rating can result in higher interest rates, and having a lot of debt can reduce the rating. Additionally, it requires discipline to make repayments on time, which can lead to less financial stability, potential investors may see a company that is highly reliant on debt as being too risky, limiting access to equity funding. Finally, the company needs to have collateral, putting some of its assets in danger, since even if the company is down, it still has to pay for interests and in the exit will have to have enough money to pay for the debt.

In order to decide the capital structure, the maximum leverage and covenants are set on the **Bank Case**, a more conservative case, that then should be tested and evaluated on the Investment and Management cases. **Senior debt** refers to loans and other commitments that would be paid back first if the company goes bankrupt or in a case of liquidation. There is a lowest risk associated with senior debt due to its greatest priority. As a result, this kind of debt frequently has or offers reduced interest rates. **Mezzanine**

debt includes embedded stock instruments - often referred to as warrants - attached, which raises the value of the subordinated debt and gives you more leeway when interacting with bondholders. Mezzanine financing is widely utilized in acquisitions and buyouts, where it may be used to give new owners priority over current ones in the event of bankruptcy.

In this specific case, in order to decide the investment's capital structure, the financial results of the "pessimist case" scenario were used. Considering the investment needed and the free cash flow generation in the future, this investment will be financed with **56% of debt and 44% of equity**. Total debt, which amounts to around € 1,7B, will be composed by €1,4B (~83%) of **senior debt** and € 288M (~17%) of **subordinated debt**. In the acquisition of BA Glass, there won't be Term Loan A due to its amortization nature and its shorter term which would distress the company in the first years of more uncertain times and lower cash flows. Therefore, the most senior Tranches will be Tranche B and C, which will be bullet, with terms of 6 and 7 years and corresponding to 1,5x and 2,0x BA Glass EBITDA, amounting to around € 432M and € 575M, respectively. The company will also leverage Mezzanine debt, which is also bullet, with a term loan of 10 years, corresponding to 1x BA Glass EBITDA. In 2022, the company will use senior debt, comprised of Tranches D and E, to acquire Zignago Vetro. While Tranche D has amortization payments and a term of 5 years, corresponding to 1,5x Zignago EBITDA, which is € 158M, Tranche E is bullet and has a term of 6 years, corresponding to 2,5x Zignago EBITDA, which amounts € 264M. Depending on the term, the interest rates on the credit lines match the yields of corporate bonds with a BBB grade. The **internal rating** used by one of the main Portuguese credit institutions, with which BA Glass has a long-standing connection, was used to provide the credit rating for the

project. The amount committed by the bank to this deal but yet not raised is subject to a commitment fee of 0,5%.

The other 44% of the amount needed to fund this project will be constituted by equity and provided by a combination of **institutional investors** and the **management team**. The alignment of interests between the PE fund and management is a critical component of successful private equity transactions. Appropriate compensation packages are used to accomplish this alignment, whereby the fund guarantees downside protection, while the management receives a sizable payout in line with the performance of the PE. In order to have this strong alignment, management gets **10% of the company**, while the company investors get 90%. For this purpose, are created **ordinary shares**, in which the management team invests the equivalent of 1-3years of salary, and receives their portion, the Sweet Equity. Normally is given to key people that contributed to the success of this investment. The remaining portion of the ordinary shares is invested by the fund, which covers the rest of the investment needed, receiving **preferred shares**. The fund's returns are less exponential than the management's returns since management is very incentivized to create value. The key people from BA Glass' executive board chosen to be included in the sweet equity were **Sandra Santos**, CEO and Board Member at BA Glass, **Luís Mendes**, the CFO, **Sofia Alves**, the CMO, **Iva Rodrigues Dias**, the Manager Director of Iberia, **Javier Teniente**, the Manager Director of Southeast Europe, **Tiago Moreira da Silva**, the Manager Director of Central Europe, **Renaldo Coelho**, the Chief of Innovation and Tech Office, **Abelardo Cruz**, the M&A chief, and **Isabel Monteiro**, the CPO of BA Glass. Due to a lack of information available, annual salaries were assumed, and an additional bonus was added. The value obtained was multiplied by two to determine the amount invested by the management team, which totals **€ 14M**. This €14M will represent 10% of ordinary shares, therefore, institutional investors will

contribute with € 129M, 90% of ordinary shares. The remaining amount necessary to cover the 44% of equity is €1,23B and will be financed by the fund through preferred shares.

According with the loan conditions agreed upon, as Tranches B, C, and E are bullet, none of them will be repaid until the investment exit year of 2026. Regarding **Term Loan B**, it has an interest rate of 7,11%, and it will be raised 60% of the total in 2021, with the remaining 40% to be distributed equally between 2022 and 2023, subject to commitment fees of €0,9M and €0,4M, respectively. During the holding period, this tranche will incur interest costs in the amount of € 135,1M. **Term Loan C** has an interest rate of 7,21%, and 60% of its total amount will be raised in 2021, with the remaining 40% to be split equally between 2022 and 2023, subject to commitment fees of €1,2M and €0,6M, respectively. This tranche will have an interest expense of € 182,5M during the holding period. **Regarding Tranche D**, which will be raised in 2022, amounting to € 158,2M, the company is committed to amortize 5% in 2023, 10% in 2024, 20% in 2025, and 30% in 2026, leaving 35% of the total amount to be paid at exit. While the company amortizes this Tranche, which has an interest rate of 7,04%, its annual interests decrease from €7,4M to €4,8M over these years. This Tranche is subject to a commitment fee of € 0,8M for the commitment value of 2021, and it will have interest expenses of €38,4M during the investment period. Also in 2022, **Tranche E** will be raised, amounting € 264M, subject to a commitment fee of € 1,3M in 2021 and to an interest rate of 7,11%, representing an interest expense of € 75M until the exit year. The **Mezzanine debt** also has a bullet nature, and due to its expensive interest rate, it will represent annual cash payments that increase from € 28M to € 38M from 2022 to 2026, since it amounts € 288M and is subject to a cash interest rate of 9,72% and a PIK of 8%.

The **financial resilience of BA Glass** is demonstrated by its ability to cut its net debt while increasing the cash at hand over the years. During the investment period, combining the Free Cash Flow generated by the company and extra cash available due to the overfunding, the company will have **enough cash available** to cover the debt service and the debt repayment necessary with significant headroom. Until the exit year, BA Glass will be able to amortize 65% of the Term Loan D, resulting in a decrease in the total **Net Debt from € 1,5B to € 1,3B**, from 2022 to 2026. The company will have always positive cash flow movements, ending 2022 with a cash balance of around **€ 34M** and 2026 with a cash balance of **€ 442M**.

Financial covenants are financial ratios used to allocate control rights between lenders and borrowers. They demonstrate how the company is doing during the borrowing period. Equity investors maintain control if the company is "in shape", however, if the firm's condition is "poor", that is, if the financial covenants are broken and the business is in "technical default", control rights are transferred to the borrowers. Covenants are tools to establish how much debt the private equity firm can slap on the company without going over the debt covenants and credit criteria the lenders would impose. The lender safeguards the safety and security of the money it lends out and defends itself from the dangers involved with the loan agreement by making it legally obligated for the borrower to maintain a particular limit of a ratio or retain a certain level of cash flow. In the event that a financial covenant is broken, the lender typically has the right to require repayment of the entire loan amount, collect collateral (if previously agreed upon) as compensation for the breach of the covenant agreement, or raise the interest rate on the loan from the previously agreed upon level. Evaluating the advantages and disadvantages for the borrowers, financial covenants are a way to win the lender's confidence because they provide security for the lending party against the risks associated with loan arrangements.

Additionally, when the borrower is required to maintain specific ratios or a set amount of cash flow, it is also assuring its own financial stability. However, financial covenants may be constraining and restrictive for the borrower as they may limit their ability to make financial or economic decisions since their actions may be highly limited or constrained in order to maintain a particular ratio level or cash flow, and they limit the borrowing party's financial flexibility as they prevent them from spending as much as they would have intended to, placing them at risk of violation and increasing their potential losses.

The ratio of a company's net debt to EBITDA evaluates its financial leverage and debt-paying capacity. In principle, the net debt to EBITDA ratio (debt/EBITDA) indicates how long a business would have to continue operating at its present level in order to pay off all of its debt. Credit rating companies frequently use the ratio to estimate the likelihood that a firm will not pay its debts when due. During the forecasted period, BA Glass will increase its EBITDA and amortize its outstanding debt, and thus the **Net Debt/EBITDA** adjusted ratio will **gradually decrease**, achieving a value of **1.9x in 2026** in the bank debt. It is important to notice that the company is in compliance with the key limit control of 4.0x imposed by the Board in order to ensure financial stability. The **Interest Coverage Ratio** (ICR), also known as "times interest earned" is used to assess a company's capacity to pay the interest on its outstanding debt. The ICR is commonly used by creditors, investors, and lenders to determine how safe it is to lend money to a company. BA Glass will be able to cover its interests with a significant headroom between 2022 and 2026 since the minimum ratio is **5.2x in the Bank case**. Lastly, the **Cash Cover** is used to measure the ability of a company to cover its interest expense and debt repayments with its available funds. During the forecasted years, cash cover is expected to be **always above** the proposed covenant of 1.0x, and always equal or above the 1.2x,

a more conservative covenant, which means the company has the ability to pay its debt service with the cash available in each year.

During the 5-year holding period, BA Glass will generate value in the amount of **€ 2,7B**, being the main growth drivers the revenue expansion, margin expansion, deleveraging, and multiple arbitrage. A total of € 1016M in value is generated by **revenue growth**, accounting for **33%** of the total equity value creation, of which 78% (€ 791M) emerges from organic revenue growth and 22% (€ 225M) from inorganic revenue growth. The **EBITDA margin expansion** is the biggest value generator, augmenting value in €1,2B, which represents **38%** of the total equity value creation, of which 62% (€ 725M) provides from organic growth and 38% (€ 437M) from inorganic growth. Additionally, **deleverage** of around €760M is achieved through high cash generation and represents **25%** of the total equity value creation. Lastly, **multiple arbitrage** is attained through the acquisition of Zignago, which is bought at a multiple of 6.8x and incorporated into BA Glass, taking its exit multiple, representing **3%** of the total equity value generated.

At the exit year, assuming the exit year is equal to the entry one of 7.3x, and with an EBITDA of € 699M, the company will be **sold for € 5,1B**. All of the net debt, which totals € 957M, will be paid at this point, along with € 76M in exit fees. After repaying all the debt and fees, the company will have an **equity value of € 4,1B** to distribute among investors. First, both **subordinated loans**, that account for **€ 1,8B**, will be returned to investors, The remaining **€ 2,3B** will be distributed between the management team and institutional investors in proportion to their ownership stakes of ordinary shares. As result, the management team, which owns 10%, will receive € 228M, while institutional investors, who own 90%, will receive € 2,1B.

In terms of returns, **institutional investors** invested €1,36B, which will be multiplied by **2.8x** five years later, resulting in proceeds of €3,8B. As a result, their

investment will have an IRR of **24,2%.** The **management team**, on the other hand, will see its investment of € 14M multiplied by **15.9x** five years later, resulting in proceeds of € 228M and an IRR of **73,9%**. To assess the risk of making this investment, a **sensitivity analysis** was conducted by altering the implied multiples. The results are very encouraging since, even in a more pessimist scenario with an entry multiple of 8.3x and an exit multiple of 6.3x, institutional investors are expected to multiply their investment by 2.02x, representing an IRR of 15,8%. In opposition, if the entry multiple is 6.3x and the exit multiple is 8.3x, institutional investors are expected to multiply their investment by 4.04x, representing an IRR of 34,2%.

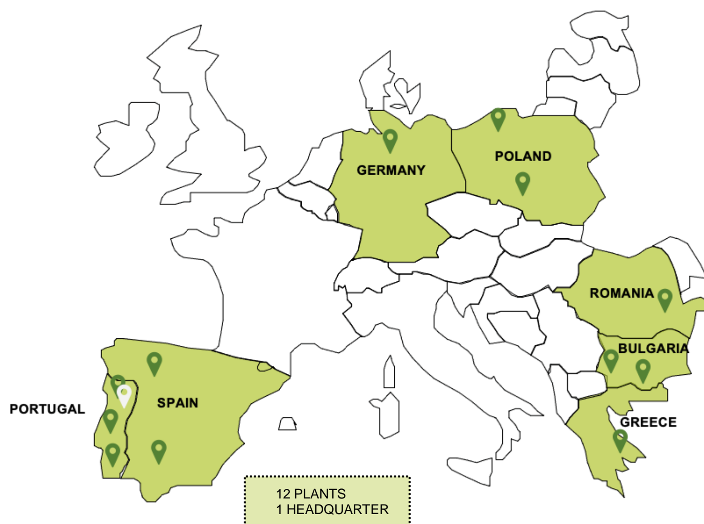
It is also important to evaluate this investment on an **organic level**, without the acquisition of Zignago Vetro. In fact, if there is no acquisition, institutional investors have an IRR of **21%** (vs. 24% with acquisition) and a MM of **2.57x** (vs. 2.81x with acquisition), and the management team has an IRR of 59% (vs. 74%) and a MM of 10.09x (vs. 15.93x). Therefore it is notable that this is an investment that **makes sense both organically and inorganically**, as findings illustrate the significant certainty of favourable returns when investing in BA Glass.

In addition, the impact that each of the four assumptions considered in the business plan on the investors' IRR was assessed. Price and volume changes based on previously identified and explicated drivers are used to calculate **revenue growth**. In the pessimistic scenario, by decreasing the annual growth of revenues by 1,5%, **the IRR is reduced by 5,2 p.p.,** while in the optimistic scenario, the **IRR increases by 4.8 p.p**. Due to its many competitive advantages, BA Glass is assumed to pass on an additional percentage of cost increases to its customers' prices under the **Cost Passage** assumption. In the pessimistic scenario, instead of being able to pass 55% of the increase in its costs, the company is only able to pass 50%. The latter has a **negative impact on the IRR, measured in 0,3**

p.p., so this reduction does not represent a threat to the company. Regarding the **Natural Gas prices**, it was evaluated an increase or decrease of 15% in the natural gas prices, that showed to have a relevant impact since in both the pessimistic and optimistic scenarios, the **IRR decreased by 1,7 p.p. and increased by 1,7 p.p.**, respectively. Lastly, the effect of Zignago´s acquisition on BA Glass' **operational improvements**, namely in the COGS and Supplies and External services in Central Europe was also assessed. These synergies have minimal impact, having almost no effect on the investors' IRR. Due to their significant impact on the IRR, this analysis found that revenue growth and natural gas prices are among the **most important hypotheses** to consider during the due diligence process.

Appendix

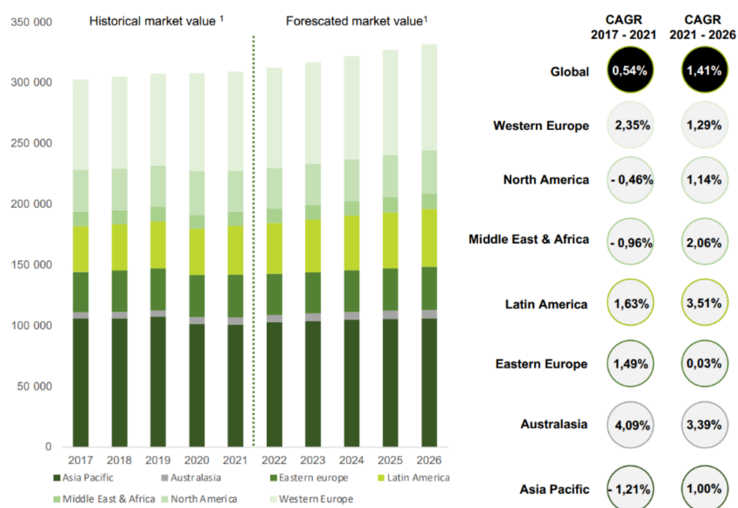
Appendix 1.1: BA Glass geographical presence



Appendix 2.1: Historical Sales from Contract

In millions of Euros		2017H	2018H	2019H	2020H	2021H
Iberia		446	459	508	517	548
	YoY Growth in %	*-3%*	*3%*	*11%*	*2%*	*6%*
CE		152	173	184	175	183
	YoY Growth in %	*26%*	*14%*	*6%*	*-5%*	*5%*
SSE		206	223	232	239	286
	YoY Growth in %	*N/A*	*8%*	*4%*	*3%*	*19%*
Sales from contracts		**804**	**854**	**923**	**931**	**1 016**

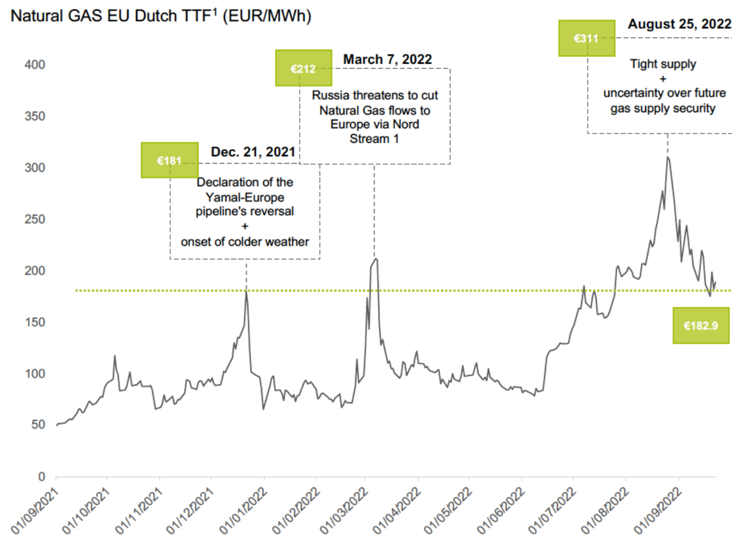
Appendix 3.1: Global Packaging Market by region



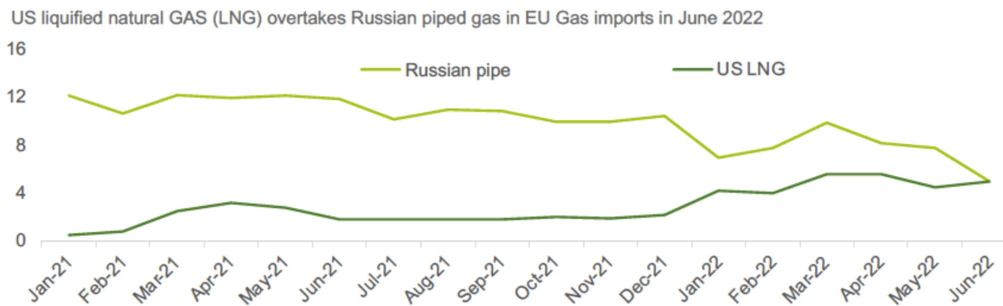
Appendix 3.2: Competitive Landscape

Company	Sales ($,M)			EBITDA Margin			Net Debt/ EBITDA			CCC			PRODUCT PORTFOLIO Beverages	Food	Pharma
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021			
O-I	5 977	5 343 ▼	5 377 ▲	8,2%	17,8% ▲	15,7% ▼	3,2x	4,0x ▲	3,6x ▼	14	19 ▲	14 ▼	X	X	X
vetropack	643	619 ▼	755 ▲	23,0%	25,1% ▲	19,7% ▼	-0,5x	-0,4x ▲	-0,6x ▼	104	111 ▲	94 ▼	X	X	X
verallia	2 586	2 536 ▼	2 674 ▲	21,3%	23,4% ▲	24,3% ▲	2,7x	1,3x ▼	1,3x ▼	15	-6 ▼	-13 ▼	X	X	
vidrala	1 011	989 ▼	1 085 ▲	25,9%	19,6% ▼	16,3% ▼	0,9x	0,4x ▼	0,1x ▼	66	56 ▲	31 ▼	X	X	
BA	932	941 ▲	1 035 ▲	32,5%	34,9% ▲	24,0% ▼	1,8x	1,2x ▼	1,6x ▲	55	44 ▲	-1 ▼	X	X	

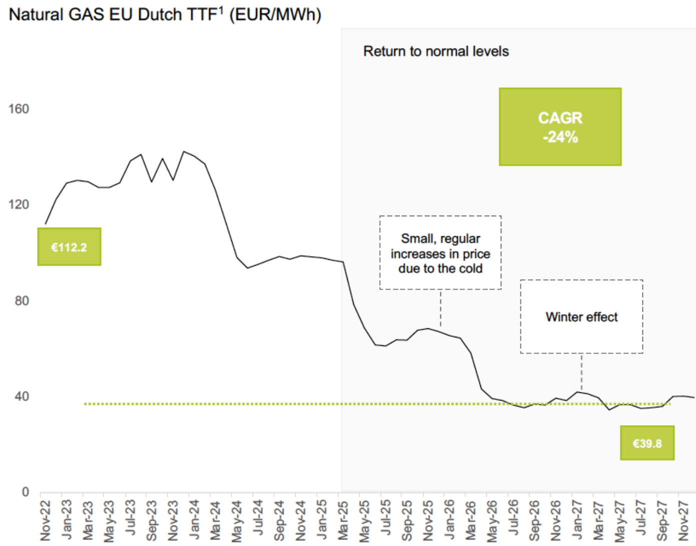
Appendix 4.1: Historical prices for natural gas EU Dutch TTF (EUR/MWh)



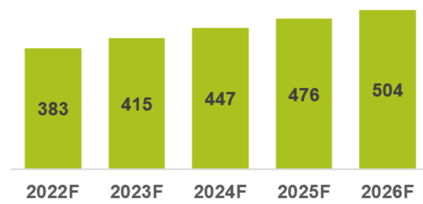
Appendix 4.2: EU imports of gas



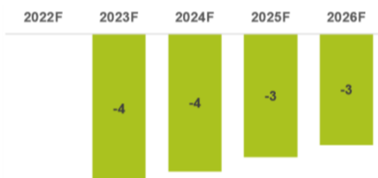
Appendix 4.3: Forecast of prices for natural gas EU Dutch TTF (EUR/MWh)



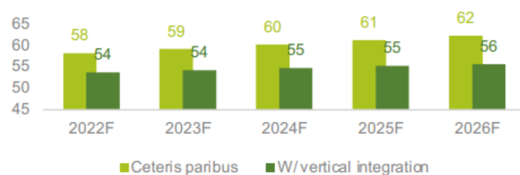
Appendix 5.1 Revenues from Horizontal Expansion (Millions of Euros)



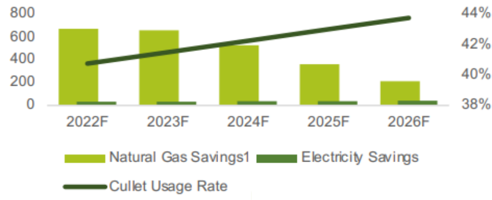
Appendix 5.2. Operational Cost Savings from Horizontal Expansion (Millions of Euros)



Appendix 5.3. Estimated Cost of Cullet (Millions of Euros)



Appendix 5.4. Estimated Energy Savings (Thousands of Euros)



Appendix 6.1: Past transactions in the glass manufacturing industry

Year	Currency	Target Name	Accquirer Name	EV	EV/EBITDA	Status	Average
2020	USD	Verallia	BW Gestão de Investimentos	5 959	9,8x	Completed	7,3x
2019	USD	NFNV	O-I	167	4,2x	Completed	7,3x
2018	EUR	Santos Barosa	Vidrala	253	7,7x	Completed	7,3x
2017	USD	Anchor Glass	BA Glass, CVC	1 040	7,3x	Completed	7,3x
2017	EUR	Drujba Glassworks AD	BA Vidro SA	188	5,2x	Completed	7,3x
2015	EUR	Encirc	Vidrala	409	6,8x	Completed	7,3x
2015	EUR	Verallia	Apollo Global Management	2 950	7,4x	Completed	7,3x
2015	USD	Centor US	Gerresheimer	725	9,8x	Completed	7,3x

Appendix 6.2: Sources and Uses of Funds

BA GLASS - 2021

Total Sources	€M	x EBITDA	%
Senior debt			
Term Loan A	0	0,0x	0%
Term Loan B	432	1,5x	19%
Term Loan C	575	2,0x	25%
Subordinated debt			
Mezzanine	288	1,0x	12%
Total Debt (BA Glass)	**1 295**	**4,5x**	**56%**
BA GLASS			
Fixed Return Instrument	**883**	3,1x	38%
Ordinary Equity	**143**	0,5x	6%
Institutional Investor	129		
Sweet Equity	14	10,0%	
Total Equity	**1 027**	**3,6x**	**44%**
Total sources BA Glass	**2 321**	**8,1x**	**100%**

Total Uses		€M
EBITDA 2021*		288
Multiple		7,3x
Enterprise Value		**2 094**
Total Fees	3,2%	68
Due Diligence Fees	1,0%	21
Advisory Fees	1,0%	21
Banking Fees	2,0%	26
Overfunding[1]		159
Total Uses		**2 321**

ZIGNAGO - 2022

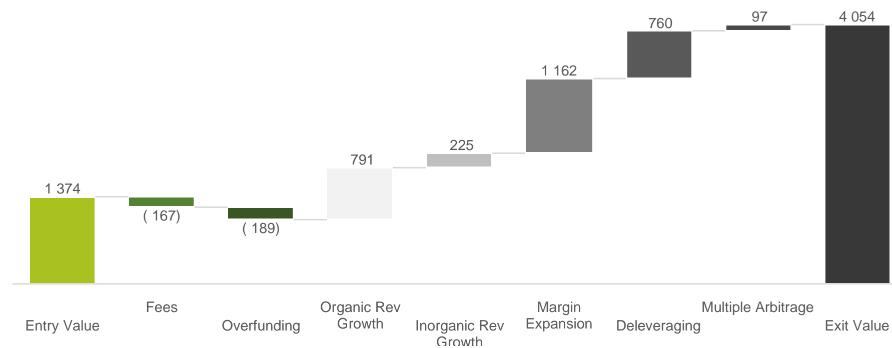
Total Sources	€M	x EBITDA	%
Senior debt			
Term Loan D	158	1,5x	21%
Term Loan E	264	2,5x	34%
Total Debt (Zignago)	**422**	**4,0x**	**55%**
ZIGNAGO VETRO			
Fixed Return Instrument	**348**	3,3x	**45%**
Total sources Zignago	**770**	**7,3x**	**100%**

Total Uses		€M
EBITDA 2022 (normalized)		105
Multiple		6,8x
Enterprise Value		**717**
Total Fees	3%	23
Due Diligence Fees	1,0%	7
Advisory Fees	1,0%	7
Banking Fees	2,0%	8
Overfunding[1]		30
Total Uses Zignago		**770**

Appendix 6.3: Capital Structure – senior and subordinated debt

Capital Structure	Term (Years)	Amort.	x EBITDA	Amount	Interest rate
Senior debt					
Term Loan A	5	Amort	0,0x	0	7,04%
Term Loan B	6	Bullet	0,5x	143	7,11%
Term Loan C	7	Bullet	1,8x	516	7,21%
Term Loan D (Recap)	5	Amort	1,0x	105	7,04%
Term Loan E (Recap)	6	Bullet	2,5x	264	7,11%
Subordinated Debt					
Mezzanine	10	Bullet	2,5x	717	8,2% (PIK 5%)

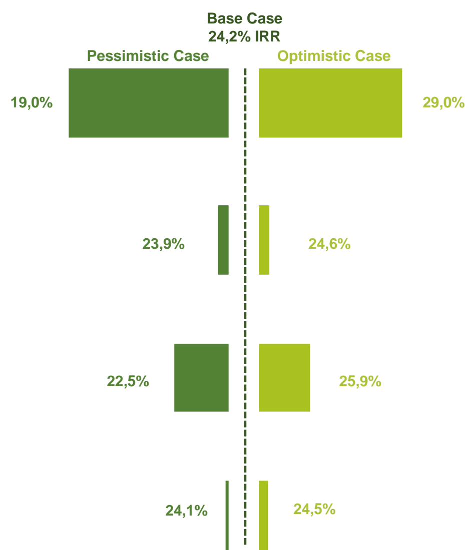
Appendix 7.1: Value Creation drivers



Appendix 7.2: Acquisition return analysis

		w/ Zignago	w/o Zignago
Institutional Investors	IRR	24%	21%
	MM	2,81x	2,57x
Management	IRR	74%	59%
	MM	15,93x	10,09x

Appendix 7.3: IRR sensitivity analysis



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