

A Work Project, presented as part of the requirements for the Award of a Master's degree in
Finance from the Nova School of Business and Economics.

INVESTMENT THESIS PAPER -
ENVITEC BIOGAS LBO
(VALUATION)

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16/12/2022

Abstract

This paper is an investment thesis report about a hypothetical leveraged buyout of EnviTec Biogas AG, a biogas plant operator and constructor from Germany. The deal is promising due to EnviTec's unique business model in an auspicious biogas market. The investment thesis is defined by internationalisation, a buy-and-build strategy, including two add-ons, and organic growth. The LBO is valued with a 9.8x EBITDA multiple leading to an enterprise value of €436.9M, of which 250m is financed with three debt tranches. The paper also includes an analysis of the valuation and a discussion of the significance, advantages and disadvantages of the valuation methods used.

Keywords (Private Equity, Leveraged Buyout, Financial Modeling, Corporate Valuation, Return Analysis, Renewable Energy, Biomass)

This work used infrastructure and resources funded by Fundação para a Ciência e a Tecnologia (UID/ECO/00124/2013, UID/ECO/00124/2019 and Social Sciences DataLab, Project 22209), POR Lisboa (LISBOA-01-0145-FEDER-007722 and Social Sciences DataLab, Project 22209) and POR Norte (Social Sciences DataLab, Project 22209).

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1 Summary of EnviTec LBO

1.1 Introduction

This paper is an investment thesis about a Leveraged-Buy-Out (LBO) of EnviTec Biogas AG (from now on referred to as EnviTec). Besides a short phone call with the Chief Operating Officer (COO) of EnviTec about developments in the biogas market and the company, research was done based on public information. Furthermore, the report is written prior to any negotiations in an M&A process. EnviTec is a convincing target because it shows stable financial development in the past without having any significant impact of a recent crisis. In addition, the biogas market is predicted to show a positive trend and good growth in the future, where EnviTec can further expand its market leadership. Lastly, it is essential that EnviTec has already started to expand internationally, and possible add-on targets could be detected.

1.2 Company Overview

Founded in 2002 by Olaf von Lehmden, Kunibert Ruhe and Tobias Schulz, EnviTec is one of the leading manufacturers and operators of biogas and biomethane plants. As a full-service biogas supplier EnviTec covers the entire value chain of biogas production. The company provides whole plant and operational management and on-demand biological and technical services. Additionally, EnviTec also operates its own plants. It operates through three business segments: own plant operation (57% of revenue), plant construction (27% of revenue), and services (16% of revenue). EnviTec is active in 16 countries across Europe, Asia, and North America. Their headquarters are located in Lohne, Germany. Co-founder and CEO Olaf von Lehmden, CFO Jörg Fischer, and CTO Jürgen Tenbrink form the executive board, which has been in charge since 2010. The latter two joined the company in 2007 and 2002, respectively. The company currently has 518 employees, among which the majority – 402 – work in Germany. In terms of business segments, most employees work in the service segment (166), followed by the own plant operation segment with 163. The plant operation segment has 139 employees.

Since 2007, EnviTec has been listed on the stock exchange after issuing 30% of its shares at the IPO (EnviTec Biogas AG 2021).

EnviTecs business is divided into three segments. EnviTecs own plants are operated in cooperation with local partners from the agricultural or energy sectors. These provide the sites, procure the feedstock materials, and take control of the factories' day-to-day operations. The partnering farmers offer the input of livestock waste, food waste or crops. EnviTec, on the opposite, executes the required maintenance work, offers biological and technical services, and handles commercial management. The generated electricity, heat, and gas in EnviTec's national and international plants are subsequently marketed to utilities.

In addition to operating plants, EnviTec also plans, manufactures, and installs plants ready for production. The company's product portfolio covers the complete value chain of biogas plant engineering for plants from 75kW onwards. EnviTec offers three different types of plants: EnviFarm Classic, EnviFarm Compact, and EnviThan. The raw materials required for the construction of the biogas and biomethane plants are provided by external suppliers. Afterwards, biogas and biomethane plants are marketed towards farmers, industrial enterprises, and energy providers.

Finally, the service segment offers all operations-related services for biogas plants to existing or third-party customers. The company's experts take care of the plant's start-up and the permanent biological processes' monitoring. EnviTec's laboratories improve the plant's efficiency by controlling feedstock materials and fermentation residues for the best quality. The range of services also includes regular plant inspections and training of the operators and their employees. In addition, EnviTec offers two types of maintenance services: Partial maintenance services invoiced according to actual expenditure and complete maintenance with the

assumption of the repair cost risk. On request, EnviTec markets electricity, natural biogas, and heat.

1.3 Market Overview

The Market for Energy generated from biomass is highly dynamic and offers strong potential. Historically, the global Bioenergy capacity has constantly been growing with a CAGR of 7.2% from 2009 to 2021 (IRENA 2022). In detail, the energy capacity generated from biomass grew from 62 gigawatts in 2009 to 143 gigawatts in 2021. The constant growth derives from different regions expanding their biomass energy capacity at different times. Generally, Europe, especially Germany, are at the forefront in innovation and development of biogas-related products (EnviTec's primary market). On the other hand, other regions like Asia or the U.S. are driving growth, while markets like Germany are more saturated. The limiting factor is space to supply biomass that can be used in production. In Germany, for example, there is a need for more space to expand the biogas market further. However, with changing regulations favouring biogas products, even saturated markets like Germany should start growing soon. As a result, the global CAGR from 2021 to 2030 is expected to be 7.3%, like the historical growth (Fortune Business Insights, 2021; Research and Markers, 2021; Grand View Research, 2021).

The primary market trend driving not only the biogas market but also the market for renewable energies, in general, is the pressing need for environmental change to reduce global warming and carbon dioxide output. By nature, this is an ongoing issue and will continue to drive market growth. However, the excellent potential for the biogas market can be explained only in combination with other factors. A big part of biogas development is determined by the regulatory environment, which is changing in favour of biogas. The global change in agendas, especially in Europe, stems from the macroeconomic developments since the war between Russia and Ukraine broke out. The biogas industry is profiting from recent changes due to its most significant feature; energy from biomass can be saved in the form of gas or fuel. This is a

significant advantage compared to other renewable energies. Further, the need for gas and fuels that can replace fossil fuels and natural gas has grown immensely since the start of the Ukraine war due to the high dependency on Russian gas. Therefore, Germany decided to lift the biogas cap, supporting the usage of more biogas-related products and shifting to a renewable energy strategy, including biogas.

As mentioned earlier, the German market growth stagnated in recent history and did not look promising. Since already 10,000 plants are operated to produce heat, electricity, and biogas. However, recently the main driver is the production of biogas or biofuels. Furthermore, with the macroeconomic changes and the rising need for gas and fuel alternatives, the regulatory environment has changed to support the production of biogas and biofuels. Therefore, growth is expected to increase soon. As a result, the market volume will increase by €1.1B in 2022, which marks roughly a 12% increase (Fachverband Biogas 2022). The market is highly fragmented, and on paper, EnviTec captures a tiny portion of the market, operating 81 plants out of 9,519 in Germany (EnviTec Biogas 2022). However, most plants are operated by farmers or industrial businesses that use their waste products or crops to produce bioenergy, either sustaining themselves or delivering it to their local community. However, EnviTec is the leading player in bioenergy as they operate the most plants and serve the fragmented market by manufacturing plants. Furthermore, they are specialised in biomass and distinguish themselves from other big players.

1.4 Historical Financials

On the income statement, it can be observed that since 2016 the revenue has grown with a CAGR of 10.0%. Even though the average growth is remarkable, the revenue declined in 2018 and 2020 by 6.0% and 10.0%. In 2017 the reason for this was mainly the streamlined structure of the plant construction, which led to a revenue decline of €33.5M (26.5%) in the business unit. Like many other businesses in 2020, EnviTec's performance was negatively impacted by

economic stagnation triggered by the COVID-19 pandemic, leading to a backlog of investments, customers and difficulties in implementing construction projects. In line with the total revenue, each of the three business units has increased over the years. Still, only plant construction can increase its relative share from 19% to 27% due to expansion towards other countries. Operating Costs of EnviTec consist of the cost of goods sold (COGS), Selling, General and Administrative Expenses (SG&A) and Other Operating Income/Expenses (OOI/OOE). Thereof COGS represent the largest share with, on average, 68.0% of the revenue. Even though the relative peak of the COGS was in 2017 and 2019 (both 70.4%), management expects the COGS to be at a peak due to high electricity prices. SG&A and OOI/OOE have remained stable over the years, with an average of 10.8% and 7.1% of revenue. However, the overhead costs have decreased over the years, resulting in 1.3% and 1.5% fewer expenditures in relation to revenue. As a result of the cost development, the EBITDA increased from €22.1M to €37.2M. Concerning the fluctuation in revenue growth, it is remarkable that EnviTec increased its EBITDA constantly in the last eight years, averaging a 14% margin. Despite constant growth in the revenue and profitability level, D&A is continuously decreasing. Concerning revenue, this means a shrinkage from 11% to 6%. The decrease in D&A results from the decreasing PPE position (see balance sheet paragraph). However, this observation improves the operating result (EBIT) even more. Being negative with €17.8M in 2016, the EBIT reaches its peak in 2021 with €21.3M, resulting in an overall improvement of €37.1M in 5 years.

For the balance sheet, there is a clear trend recognisable. On the asset side, it is observable that current assets are increasing over time while non-current assets are strongly declining. The increase in construction and orders strongly drives the growth of the current asset section. Non-Current Assets decreased mainly due to the €34.9M reduction in PPE. The decrease was triggered by the backlog of investments and the D&A exceeding new investments. The decline

on the liability side is driven by the payback of long-term debt (-€17.2M) over the years, exceeding the new debt issuance. The reduction in total Assets and Liabilities is leading to an increased Return on Capital Employed (ROCE), having its peak in 2021 at 14%. One result of the increase in current assets and liabilities is an enormous high Cash Conversion Cycle of 144 days in 2021. Even though it improved since its peak of 209 days in 2016, it is still comparably high towards its competitors (they average 64 days). However, this might not be a sign of a mismatch in demand (see market overview) but rather an opportunity for further operational improvement, which is reflected in the business plan.

On the Cash Flow Statement, the Free Cash Flow (FCF) is mainly determined by the cash flow of operations, as the investment backlog in recent years led to a relatively small cash flow of investments. Only in 2021 investments of €12.9M were made, resulting in a constant positive FCF ranging from €7.3M in 2017 to €31.1M in 2019, with stable positive numbers in all recent years. On the other hand, the cash flow of financing is always negative due to the payback of debt and the dividend distribution of €1 per share in the last three years. Finally, EnviTec increased its Operating Cash Flow compared to revenue from 10% in 2016 towards 14% in 2021.

1.5 Investment Thesis

Creating an investment thesis and identifying possible value drivers is based on derivations of four main pillars. Combining the market development (described above) with EnviTecs business model and competitive advantages, it can be derived that an expected Market CAGR of 7.2% stands for the exceptional growth the market environment is offering (market tailwind). Further, EnviTec specialises in biogas applications, while most competitors only provide biogas as a niche product (exceptional expertise). Moreover, regulations like the 'Biogas-Cap' in Germany will be lifted, and international agreements (Paris Agreement) will further drive growth (regulatory environment). Additionally, constant cash flows indicate a stable and

reliable target (strong and steady financials). The analysis of those statements for the business segments plant operation and plant constructions results in three main drivers on which value creation is based: Internationalisation, 'buy & build' and organic growth. The service business unit is neglected because its growth is mainly derived from plant construction. High market fragmentation, excellent cost efficacy, and high competitive edge identify own plant operation as the main growth driver. Therefore, EnviTec is in a prime position to use its expertise in other markets. This could result in gaining market share in high-growth markets with lower saturation, such as Asia and especially the U.S.. However, with changing regulations in Germany and more plants falling out of subsidies in 2025, EnviTec is set to grow organically in Germany and surrounding tapped markets, such as France or Denmark. By opening or acquiring new plants, EnviTec can expand its portfolio and integrate those into its existing portfolio. For plant construction, buy & build is the best value driver. As a benefit, EnviTec could capture revenue, client connections and market share by not only entering into high-growth markets (Asia and the U.S.) but also gaining market share in less saturated markets in Europe. The analysis of the growth opportunity of internationalisation points out the strong potential not tapped in other continents. For example, Asia only supplies 35% of global biogas, indicating the market's enormous potential and especially keeping in mind that South and East Asia are producing 40% of the world's municipal solid waste, which is the raw material for biogas plants. The North American Market is just at the start of its development and, therefore, an attractive target for an internationalisation strategy. The American Biogas Council estimates over 15,000 potential biogas facilities in action, leading to a CAGR of 23% in the U.S.. However, especially the Biogas Production (non-electricity projects) grew with a CAGR of 43%, leaving space for EnviTec to grow. The growth opportunity of buy & build assumes that EnviTec will acquire two add-ons during the holding period. Screening possible add-ons, Scandinavian Biogas Fuels (from now on referred to as Scandinavian) and Clover Power PLC

(from now on referred to as Clover) convinced as the best add-ons. The first is a Stockholm-based constructor and operator of biogas mainly focused on the design and building of plants. Operating primarily in the Nordic Region and South Korea, they managed to earn €38.8M in revenue and an EBITDA of €8.9M. The add-on should help increase revenue and access the Scandinavian market and utilities. Clover is located in Bangkok and specialises in generating and selling electricity. Further, they sell machinery and render construction engineering services. Clover has subsidiaries in various regions in Southeast Asia, which should help connect Thailand's utilities and access the Australian market. Clover had revenue of €45.6M with an EBITDA of €7.5M in 2021. Both add-ons would meet the aim of internationalisation & knowledge expansion. In terms of organic growth, EnviTec is benefitting from an increasing order backlog which rose from €142.1M in December 2021 to €219.0M in June 2022. However, since regulation has heavily held back new investments in Germany since 2011, the outlook seems promising for biogas plants. Furthermore, operational improvement is affected by high electricity costs, which are expected to decrease COGS in relation to revenue in the forecast period by 2%. Lastly, EnviTec aims to gain a strong position in the bio-fuel market. To be able to produce biofuel, there is a need to upgrade their plants with liquefaction tools to convert biogas into biofuel. For that reason, EnviTec bought the largest biogas-plant-park in Güstrow (start 2023) and purchased additional bio-methane (contracts >€100M) to ensure the bio-methane supply to produce biofuels. As a result, existing plants will successively be converted into bio-LNG-producing plants, which can be seen as a product-mix enhancement.

1.6 Business Plan

The Business Plan for EnviTec must be looked at from multiple perspectives. First, the core business must be evaluated and forecasted, including their three main business lines (Own Plant Operation, Plant Construction and Service). Afterwards, the M&A strategy must be included by forecasting the desired targets and incorporating them into a merged business plan that

illustrates the financial forecast across the board, which will be based on the following valuation and returns. The plant operation business can be forecasted based on the number of operating plants and the revenue generated per plant. EnviTec operates 81 plants in Germany and eight in the rest of Europe. Those yield, on average, a return of €1.7M per plant. Based on these values, different growth rates per region were applied. In Germany and Europe, very conservative growth rates start from 4% in 2022 and move down to 2% in 2027. For international expansion, it is planned to open two plants in Asia and two in the U.S. in 2022, which will grow by 100%, moving down to 30% in 2027. This will lead to 125 plants globally in 2027, yielding a revenue of €211.6M. The plant construction is less detailed, and no particular KPI can be applied to forecast the revenue due to a lack of data. Therefore, the global CAGR of 7.2% is applied, with a downward trend leading to a growth rate of 6% in 2027. This results in a revenue of €102.7M in 2027. The amount of Megawatt (MW) serviced in the Service Segment is applied as a growth factor. Per MW, EnviTec earns historically €0.07M. The segment is divided into Germany and other countries. In Germany, again, a conservative growth rate is applied based on the historical average of 2.6%, while in other regions, more robust growth is assumed from 16% in 2022 to 8% in 2027. This implies a revenue of €58.7M in 2027. Overall, this leads to a growth rate in 2022, in the investment case, of 5.3%. Each segment adjusts all growth rates per case scenario by 3%. Therefore, there is less growth in the bank case and higher in the management case leading to a core revenue of €373.0M in 2027, indicating a CAGR of 5.8%. The costs are held constant over the holding period as a percentage of sales. COGS are subject to a 1% decrease compared to sales in 2025. This is due to the expectation of decreasing utility costs (electricity prices). The SG&A costs are expected to stay constant at 9.8% of revenue. Again, these values vary by 1% negatively or positively in the other cases. Other expenses are expected to remain stable at €14.5M over the holding period. This is resulting in a core EBITDA of €68.1M in 2027. D&A is based on the percentage of PPE

historically and will amount to €21.1M in 2027. The working capital is forecasted based on DPO, DSO, DIO and other current assets and liabilities. Their development is based on 2021 values and is generally expected to decrease towards the mean of the industry average. More effective cash management will likely be applied after the takeover. Other current assets and liabilities are based on their percentage of sales in 2021 and are expected to stay constant over the holding period. This leads to a CCC of 103.3 in 2027, compared to 125.7 in 2021. As a result, working capital is decreasing in relatively small steps of €1M to €2M due to higher efficiency in cash management. CAPEX is mainly based on the spending on machinery, in terms of maintenance CAPEX and is forecasted based on the growth of the machinery park. Therefore, forecasting the asset turnover, which is historically at 1.5, is applied, with the assumption to remain constant at 1.6 as of 2022 (varying by 0.2 per case). As a result, the CAPEX remains relatively stable between €10M and €15M.

The planned internationalisation comes with an M&A Strategy that implies acquiring the two add-ons mentioned earlier (Scandinavian in 2023; Clover in 2024). Revenues are based on historical averages, implying a decreasing growth due to their high growth prospect in recent years. Costs are summed up between SG&A and COGS. They are forecasted based on the historical percentages of sales. However, there is a declining trend built in due to the increasing efficiency after integration. CAPEX, NWC and relevant Balance Sheet items are forecasted similarly to the core forecast. The add-on forecasts vary as well, based on the scenario applied. This leads to additional revenue of €165.1M in 2027 and an additional EBITDA of €46.7M. In Summary, the Business Plan yields a revenue of €518.8M and an EBITDA of €99.0M in 2027 (Bank Case: €465.9M, €81.6M; Management Case: €577.8M, €117.1M)

1.7 Valuation and Capital Structure

The valuation is conducted using intrinsic and relative valuation methods. The DCF implemented the intrinsic valuation with the Gordon-Growth model and the DCF multiple

methods. EV/ EBITDA, EV/ EBIT, EV/Sales and precedent transactions multiples were used for the relative valuation. The derivation of a final valuation is conducted using the EV/EBITDA Multiple, the most common valuation method for Private Equity transactions (Wardowski, Y., 2022). In addition, the DCF methods were not considered, as their valuations were outliers compared to the others. To observe the final multiple of 9.8x, the average of several multiples was used: Precedent Transactions 9.6x, EV/EBITDA LTM 9.2x, EV/EBITDA 10-year average 11.0x, EV/EBITDA LTM 9.2x and EV/Sales 9.1x. With the implied EV/EBITDA multiple of 9.8x and the 2022 EBITDA of €44.8M, EnviTec is valued at an EV of €436.9M. Different debt structures can be applied within the model. The structure used comprises three debt layers. A stretched senior loan of €105M, yielding 5.82% in interest and is amortising by 7.5% each year, a term-b loan of €50M, yielding 6.32% and is repaid as a bullet in 2029 and a term-c loan of €45M, yielding 6.82% in interest and being repaid as a bullet in 2029, totalling €250M in debt. The equity contribution amounts to €222.2M, which is distributed on institutional ordinary shares of €18M, sweet equity of €6M and shareholder loan of €198.2M, which yields a PIK interest of 8%. For the add-on acquisitions, shareholder loans of €48.6M in 2023 are added, while €32.8M in 2023 and €83.8M in 2024 are added as a stretched senior loan.

1.8 Returns and Exit Strategy

The investment in EnviTec is expected to generate a money multiple of 2.47x and an IRR of 20.6% when exiting in 2027, thus completing a 5-year holding period. The exit value is predicted to be €965.9M. When breaking down the exit value into its components as presented in the exit waterfall, the shareholder loans account for €362.7M, net debt for €213.0M, investor shares for €292.7M, and the management shares for €97.6M. Overall, this represents a total value generation of €529M. The EV of €965.9M consists of the EBITDA generated in the last year, 2027, of €99M multiplied with the exit multiple of 9.8x. Since no multiple arbitrages are

assumed, the entry multiple equals the exit multiple. A total of €327.3M remains in the company as debt, consisting of €65.6M stretched senior loan, €75M term loan B, €70M term loan C and €116.6M add-ons. Considering the investors' perspective, the total amount invested is €264.8M, as they hold €216.2M upon entry and add €48.6M in shareholder loans in 2023 for M&A activity. Their IRR is 20.6%, their money multiple is 2.47x, and their proceeds €655.4M. From the management's perspective, the total amount invested equals €6M, the IRR 74.6%, the money multiple 16.30x, and the proceeds €97.6M. Regarding the credit statistics, the cash interest coverage is increasing over the holding period to 3.0x in 2027. One primary driver for the sharp increase is the strong EBIT development and the robust cash conversion, leading to a deleveraging of the stretched senior loan. As a result, Net Debt/EBITDA is decreasing over the investment period to 2.2x, mainly caused by a considerable cash flow generation. Alternatively, the bank case captures less growth in high-potential markets, subsequently causing a less optimal business development. In addition, in this scenario, the M&A targets are developing to a lesser extent after being integrated. In contrast, the management case captures more growth in high-potential markets leading to enhanced business development.

Moreover, the M&A targets are also developing stronger after their integration in this case. The equity at entry equals €222M and reaches €753M at the exit. This increase is comprised of different components. First, the accumulated cash amount in 2027 is equal to €114.3M. After subtracting the initial cash of €25.4M and the transaction cost of €10.0M paid in cash, the net cash produced in the holding period amounts to €71.2M. Even if €39.4m debt is paid-off during the holding period, the debt amount at exit increases by €77M due to the add-ons. In addition, organic growth increased the equity by €154.5M over the holding period. The two add-ons further increase the equity by €251.2M, thus causing the most significant increase.

The margin expansion results from an EBITDA-margin improvement of the core business and the add-ons. Overall, the EBITDA margin improved by 2.9% during the holding period,

including synergy effects. Finally, the multiple arbitrage solely represents a small proportion of the equity growth since it is limited to the arbitrage of Clover. The add-on generates a 0.9x EBITDA (2027) arbitrage, resulting in a €12.2M increase in equity. Each add-on increases the IRR and the money multiple than the case without any transaction. Scandinavia increases the money multiple by 0.06 and IRR by 1.3% due to its higher purchase price linked to its significant asset base, while Clover causes the MM to grow by 0.11 and the IRR by 1.4%. Regarding the exit options, two scenarios appear to be plausible. Either a strategic sale to a large energy company or a secondary buyout to another PE fund.

1.9 Due Diligence

Certain areas related to the business of EnviTec remain ambiguous and therefore require further analysis. For example, insufficient information is provided on the profitability and remaining lifespan of the individual plants, which could result in higher maintenance costs than planned. Furthermore, an in-depth analysis of add-ons is required, as the value creation expected through the acquisition of Clover could be limited due to entry barriers and unrealised synergies. Moreover, a detailed employee analysis must be conducted to reduce workforce inefficiencies, as no employee split currently is available. Finally, regarding the financials, further information on PPE and D&A is necessary to comprehend the past development of both positions better and, more precisely, predict future performance.

Additionally, it is currently impossible to view the profitability of the individual segments due to missing information. As a result, specific segments could be less profitable than assumed, which could alter the strategies applied. Finally, EnviTec is highly dependent on regulations under construction law and pollution control law. Therefore, a deeper insight into the current and future legal situation at a national level is necessary.

2 Valuation

3.1 Importance of Valuation

To emphasise the importance of valuation, keeping the purpose, respectively, the business model of Private Equity investors in mind is helpful. Funds invest in the private market, intending to provide attractive returns to their investors (limited partners). Those attractive returns arise from the value creation the fund manages to realise with the portfolio company during the holding period. Further breaking down the value creation, there are four main levers the fund can add value to its investment. The first is to increase the revenue while keeping the same profitability. Secondly, funds could also improve profitability, reducing costs in relation to revenue. Thirdly, the add-on of leverage increases the return on equity for investors making investments more profitable. However, the add-on of debt is only healthy to a limited extent, making the company riskier. Further, cash management can improve, resulting in a decrease in the cash conversion cycle. Lastly, the most influential lever is to improve the multiple valuation when selling the company. In an ideal case, the fund can buy the investment at a comparably small multiple and sell it at a higher multiple. Even though it can be a small change, the impact on returns is immense. For the EnviTec LBO, an increase of the exit multiple by 1x increases the money multiple by 0.32 and IRR by 3.0%. As a result, it can be concluded that valuation is a tool to determine the purchase price and increase returns and make the business of funds profitable. As the business plan of the EnviTec LBO includes a buy-and-build strategy with the acquisitions of two add-on targets, valuation is needed for the core business and the add-ons, as the add-ons are a central component for the value creation. This part of the paper will describe the most common valuation methods and analyse their advantages and disadvantages regarding the case of EnviTec and its add-ons. The valuation methods can be divided into two groups. While intrinsic valuation is based on the predicted cash flows of the company, relative valuation relies on an assessment based on a peer group.

3.2 Intrinsic Valuation

Two methods of the discounted cash flow model (DCF) were applied for intrinsic valuation: the Gordon Growth model and the multiple method. The DCFs predict the free cash flows of each year and discount them backwards to receive a present value. Even though this procedure sounds intuitive, a fine-tuning of the assumptions is required. The Free Cash Flow is derived from the assumptions made in the business plan. For the discount rate, the WACC is used (Berk and DeMarzo 2021).

$$WACC = \frac{Equity}{Debt + Equity} * r_{equity} + \frac{Debt}{Debt + Equity} * r_{debt} * (1 - Tax\ rate)$$

The cost of equity (r_{equity}) is determined with the CAPM Formula:

$$(r_{equity}) = r_{risk-free\ rate} + \beta * r_{Market\ risk\ Premium}$$

EnviTec's risk-free rate is based on a German government bond of 10y, as of 20th November 2022 (2.0%) (Bloomberg 2022), while the market risk premium (5.6%) was taken from Statista (2022). The beta of the calculation is the result of a peer-group analysis. For this purpose, EnviTecs closest competitors were analysed based on their current beta according to CapitalIQ and their debt/equity structure. As a next step, each beta of the comparable companies must get unlevered, as the different debt structures prevent immediate comparison (Berk and DeMarzo 2021).

$$\beta_{unlevered} = \frac{\beta_{levered}}{(1 + (\frac{D}{E} * (1 - Tax\ rate_{comparable}))}$$

Afterwards, it is possible to re-lever it and adjust it with the debt structure of EnviTec and its tax rate.

$$\beta_{re-levered} = \beta_{unlevered} * (1 + (\frac{D}{E} + (1 - Tax\ rate_{EnviTec}))$$

This resulted in several re-levered betas from which the average was taken ($\beta_{re-levered\ avg.} = 1.13$). For the costs of debt (r_{debt}), a reliable source was CapitalIQ, providing the average of

comparable companies' average long-term debt interest rates. This time the peer group was restricted to companies from the industry (in Europe) having the same credit rating (b+), which led to a cost of debt of (4.3%). Following the equation above, a WACC of 7.0% gets obtained, which is used to discount the free cash flows. Even if the approach and the results of both methods are similar during the forecast period, they differ in the valuation of the terminal value. The DCF (GG) underlays the following formula:

$$\text{Terminal Value} = \frac{\text{Free Cash Flow to Firm}}{(\text{WACC} - \text{growth rate})}$$

The formula implies constant growth for the company until infinity, which is expected to be a conservative 1% for EnviTec. The Enterprise value using this method resulted in €683.1m. The second DCF approach refers to relative valuation as the terminal value is determined by using a multiple on the EBITDA and discounting the result with the WACC. Adding all present values together, an enterprise value of €612.2m can get obtained.

Generally, the DCF valuation is advantageous because it includes several assumptions that can be quickly changed and adapted. Especially in times of economic change, there are vast opportunities to adapt, for example, the growth rate, market risk premium, or risk-free rate. Therefore, it can be concluded that the DCF is, in comparison to other valuation methods, very detailed. For example, it implies that there is a business plan which is forecasting all the important business decisions. Moreover, it is beneficial for investments in private markets that the valuation (only Gordon Growth) is primarily independent of its competitors, which is helpful since, typically, data like debt structure or tax rates are not listed for private companies. However, the analysis can also be misleading. Only minor adaptations in some assumptions can lead to large fluctuations in the result. For example, a change of +1% in the growth rate of EnviTec in the terminal value changes the enterprise value of the Gordon growth model by +€109.6m.

Furthermore, the wide range of assumptions can result in the overcomplexity of the model, leading to the creep in of mistakes. Due to its limitations and the heavy impact of individual assumptions, it is a good tool to compare with other valuations and get a sense of which decisions might be impactful. But, as a stand-alone valuation, it is difficult to argue for, especially when showing it to advisors (or financing institutions). Typically, they would implement more optimistically assumptions (or pessimistically). Concerning the EnviTec LBO, the DCF valuations were not considered relevant for evaluating multiple. The DCF valuations were significantly higher than the other valuations, having a range of 12.4x – 14.8x times EBITDA for the multiple DCF. Even higher multiples were observed for the DCF (GG), ranging from 13.6x – 16.9x times. Despite conservative assumptions for the final value, meaning a small growth rate of 1% and using the same exit multiple as currently valued for the entry multiple, the percentage of the terminal value in relation to the enterprise value is very high (79.9% for GG and 74,1% for multiple). Keeping in mind that a holding period of five years is expected, the relevant assumptions for the valuation refer mainly to time beyond the holding period, making the valuation less precious. As a result, the DCF valuations were excluded from the multiples of which the average was chosen to determine the overall EV/EBITDA multiple.

3.3 Relative Valuation

Relative valuation assumes that comparable companies can provide vital information to value a particular target. One could claim that the better the peer group, the better the valuation.

According to Rosenbaum and Pearl, five steps exist to fulfil a decent peer group analysis from scratch (2020). Firstly, the universe of comparable companies must be selected. Unfortunately, there are burdens when obtaining relevant information, and it is nearly impossible to create a perfect comparable peer group. Problems are related to their business profile and financial profile (Rosenbaum and Pearl 2020). Another factor can be the classification of companies,

especially as larger companies often run several business units with different profitability. Moreover, their origin and the market in which they operate can differ. Further, their strategic alignment could be different due to the different environments and expectations for the future. From a financial perspective, peers could vary in size, growth expectations or profitability level. Moreover, due liquidity or credit rating it could be challenging to find a benchmark later. Concerning EnviTec, it was challenging to match the products (and services) as well as the sectors of the competitors precisely with one of EnviTec, as none of them had the same comprehensive business model as EnviTec. Sharing some standard business units, for example, plant construction with 2G Energy, it might not be the case that 2G is also striving to enter the biofuel and liquid gas markets. Therefore, a broader look at the industry was adapted to find a fitting peer group, which included biomass electricity producers, plant constructors, bio-fuel producers, and alternative energy producers. Emphasis was also placed on the comparability of profitability. In detail companies with negative EBTIDA-margins were excluded, and the final peer group has a similar margin as EnviTec (14%). Lastly, there is a large spread between public and private companies. In practice, getting reliable data for private companies is difficult. Mostly private competitors or financial investors (especially in the small-cap/mid-cap market) are unwilling to disclose more information. By law, they have no regulations to publish anything (for transactions or their financial performance for a year), making it difficult to find fitting information about similar small-sized companies. For the case of EnviTec, this restriction was not constrained, as they are publicly listed, and they also had plenty of public competitors. However, one major player within the biogas market in Europe is the business unit of Neste, where no specific numbers about the stand-alone unit could be obtained. Even though the business unit would be a perfect competitor, it would be misleading to include Neste as the revenue of their 'oil product' business unit exceeds the revenue there are obtaining with their 'renewable product' (Neste 2021). As a second step in the Rosenbaum framework, the financial

information must be located. Research must be done in financial statements or corporate finance data tools, such as CapitalIQ or Orbis. The aim should be to determine major financial statistics and ratios. CEO's or supervisory board's notes could be of particular interest. For EnviTec, step two was done by drafting reports from CapitalIQ, including statistics, about revenue, profitability, capital structure and cash flow. In step three, the financial data must be processed and brought to the common denominator. Meaning the calculation for enterprise and equity value has to be done, as well as the determination of key financial metrics, e.g. net income or EBITDA, but also growth measures or leverage ratios to compare credit profiles. Luckily this step was already done by drafting the reports, as EnviTec peers were public, and the financial metrics were calculated by CapitalIQ. Step four comprises of benchmarking the peers and therefore looking for ranking the targets placed within it. Lastly, one should build a range of the multiples obtained from the list, in which the target should be valued. To come up with a final range (step five), outliers could be neglected, to get a more precise range and to compare the target only with the most fitting competitors. Moreover, the 25%- and 75%-quantile determined the final range. The following multiple (EBITDA, EBIT(A) and Revenue) are referred as trading multiples, while as recent transactions are known as transaction multiples. To base the purchase price on the latest valuation, trading multiples refer normally to the LTM numbers of the companies. In general, it would be more precise to make use of forward multiples. However, for EnviTec the latest full-year data (2021) was used as basis, as no business plan of the company was available. In general, to ensure comparability for the trading multiples (except revenue), each of these multiples must be adjusted for non-operating costs (Koller et al. 2005).

EV/ EBITDA

This multiple is widely used and probably the most common, especially in a mergers and acquisition environment. Calculating the multiple times the EBITDA, one observes the

enterprise value. Individual adjustments for deduction items, like net debt, provisions, or pensions, as it is done in the equity-to-enterprise value bridge, are not included. The EBITDA itself is a measure of the company's profitability. It only considers the operations and is not an indication of its cash generation or one-time costs. It is advantageous because it does not account for the company's capital structure, tax expenses or asset base. However, even if the EBITDA is positive, it must not be true that the company is cash-generating optimistic since non-operating costs are not reflected. Therefore, not only for the EBITDA but also for EBITA and EBIT, the valuation is not possible as soon as the denominator (EBITDA, EBITA and EBIT) is negative, which would imply that the companies are unprofitable. This applies mainly to distressed and turnaround investments. However, funds in those specific investment areas use different valuation methods.

EV/ EBIT & EV /EBITA

The EBITDA has one enormous disadvantage, which value investors, as Warren Buffet, often criticise. As the EBITDA does not include capital expenditure in any sense, value investors are arguing that it might not be the true profitability of the company which EBITDA is expressing (Nissim 2017). This might be the case for capital-intensive industries like utilities, manufacturing, or production. However, the use of EBITDA is much more common. Moreover, while EBITA is not adjusted for amortisation costs, EBIT is. Therefore, EBIT would be a better multiple when a company is particularly amortising its Goodwill or other intangible assets in respective years, which would influence the valuation.

EV / SALES

EV/ SALE is statistically the lowest multiple compared to the others and is mainly not used as a stand-alone multiple (Deng et al. 2012). However, as soon as targets or comparable companies are not profitable, their EBITDA (or EBIT) is negative. This happens more often in fast-growing companies, such as start-ups or companies that have not yet been able to convert their

revenue into profits or net income. Therefore, when using revenue multiples, one should restrict the peer group to specifically companies out of the same industry and only compare to companies within different growth stages (Corporate Finance Institute 18.01.2018).

Industry-specific multiples

Depending on the industry, it is also possible to include multiples in the valuation independent of financial metrics. For example, EV/ independent users or EV/ pageviews could be likely multiples for technology companies or start-ups. Industry-specific multiples add another metric to the valuation and increase insights into the industry. Typically, this gets applied to companies in initial growth stages.

Precedent Transaction

Precedent transactions have a unique position among the multiples, as they do not belong to the category of trading multiples. They aim to determine for which multiple over EBITDA recent transactions were closed. This gives a sense if current market trends could increase the valuation or generally show how demand and supply are matching on the market.

According to Rosenbaum (and Pearl 2020), a similar scheme as for the comparable companies above could be used to receive a range for the valuation based on transactions. The first step is selecting proper transactions and diving into the transaction market. Scanning databases, like CapitalIQ or Refinitiv, for transactions in the industry might give a good overview. Indeed, getting a deeper understanding of each transaction considered part of the multiple ranges is necessary. For example, transactions of financial sponsors trade typically at a lower multiple than the ones of strategic buyers. First, they are more flexible regarding returns, as a target IRR or MM or fund restrictions do not constrain them. Secondly, strategists are usually more focused on a specific target and willing to pay more. Furthermore, the transactions must be seen in the context of the respective economic (or market) conditions. E.g., transactions before a crisis or

shortly before a bubble burst are higher than in times of economic downturns. Also, the interest rate development can significantly impact the deal flow and size of the multiple. Currently, interest rates are rising and even 12 months of EURIBOR trades for 2,841 % (euribor-rates.eu, 2022). Financial sponsors will not be able to finance the transaction with the same amount of debt as one year ago (24th December 2021), when EURIBOR was below zero (-0.621%; (Euribor-rates.eu 2022)). The rising cost of debt results in lower enterprise values and transaction multiples. Other important considerations about the deal are the motivations of the transaction and the kind of sale (whether the transaction was auctioned or negotiated?). Essential information can be derived from both the buy- and the sell-side. Auctions usually lead to higher prices as more competitors increase costs. Negotiations are generally more advantageous for the buyers, as they have greater bargaining power, resulting in lower enterprise values. Moreover, hasty transactions, e.g. a sale for fear of bankruptcy, can also lead to a sale at a discount. The buy-side can expect the seller to necessarily sell until a specific date, which will decrease the price. The same applies to transactions carried out quickly, as they tend to have fewer interested parties. Step two includes the collection of the necessary information. Again, information about private transactions is hard to detect because there is nearly no need to disclose details unless public financing (such as high-yield bonds) is included (Rosenbaum and Pearl 2020). Step three (key statistics and ratios) is similar to the analysis done for trading multiples mentioned above. Still, particular emphasis must be placed on the purchase considerations, as there may be differences depending on the different payment options and the seller's acceptance of them. However, the financing structure goes beyond the scope of this paper. Again, like to trading multiples the benchmarking of the multiple is done in step four. It will help to use a narrower group as a benchmark to get a multiple range, as prior done for trading multiples. But coming to a valuation (step 5), it is more important to adjust the mean

for transactions that might have the greatest similarity to the target in terms of financial ratios, and business model.

LBO

The Leveraged Buyout is not a stand-alone valuation, but for completeness, it must be named, as financial investors use it for evaluating their targets. An LBO is typically a mixture of different valuation methods. The initial aim is to determine possible returns and the IRR, or the other way round, to know which revenue growth or increase in profitability has to happen to meet the IRR. As funds are mostly restricted in their investments towards a certain riskiness or return expectation, it is essential to model the needed improvements of a possible target before the acquisition. The LBO includes all the necessary assumptions for the purchase, meaning, sources & uses, FCF prediction, debt schedule, and return analysis. As mentioned earlier, the purchase price and exit price are essential levers of return realisation. So, funds use the valuation as a 'floor'-valuation to test the maximum bid price in an auction to obtain the needed results according to the business plan (or their own planning assumptions).

3.4 Summary Valuation

Concluding, trading and transaction multiples and DCF-models are the common way to obtain a value for a company, even though the enterprise value might vary tremendously depending on the assumptions or weighting of the methods. Generally the most efficient way to observe a multiple range as a good indication with a high probability, is to calculate all multiples as range of one determining multiple (e.g., EBITDA, as done for EnviTec) and taking the mean of it. However, the final valuation can also be adjusted for specific factors, that are not implied in the multiples, as USP or promising R&D. Especially when buyers expect to realise large synergies they will pay a premium to acquire the target, which would result in a higher multiple. Lastly, multiples can also be left out of valuation, if they would distort the range, as conducted with the DCF for EnviTec.

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Appendix

I Table of Abbreviations

AG	Aktiengesellschaft (Listed company)
CAGR	Compound annual growth rate
CAPEX	Capital expenditure
CAPM	Capital asset pricing model
CCC	Cash conversion cycle
CEO	Chief Executive Officer
CFO	Chief Financial Officer
COGS	Cost of goods sold
COO	Chief Operating Officer
CTO	Chief Technology Officer
D&A	Depreciation and amortization
DCF	Discounted cash flow
DIO	Days inventory outstanding
DPI	Distributed to paid in ratio
DPO	Days payable outstanding
DSO	Days sales outstanding
EBIT	Earnings before interest and taxes
EBITDA	Earnings before interest, taxes, depreciation and amortisation
EV	Enterprise value
FCF	Free cash flow
IPO	Initial Public Offering
IRR	Internal rate of return
KPI	Key performance indicator
kW	kilowatts
LBO	Leveraged Buyout
LNG	Liquefied natural gas
M&A	Mergers and acquisitions
MM	Money multiple
MW	Megawatt
NWC	Net working capital
OOI/OOE	Other operating income/expenses
PE	Private equity
PIK	Payment in kind
PLC	Public limited company
PPE	Property, plant, and equipment
R&D	Research and development
ROCE	Return on capital employed
SG&A	Selling, general and administrative expenses
U.S.	United States of America
USP	Unique selling point
WACC	Weighted average cost of capital