Cost Volume Profit (CPV) Analysis on PT Aneka Gas Industri Tbk

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Abstract. This study presents a comprehensive financial analysis and profit planning for PT Aneka Gas Industri Tbk, a leading industrial gas company in Indonesia. The analysis focuses on the contribution margin, break-even point, margin of safety, and profit planning for the years 2020 to 2022. The study utilizes financial data from the company's reports and applies cost-volume-profit (CVP) analysis techniques to evaluate the company's financial performance and determine its profitability. The findings reveal that the contribution margin and contribution margin ratios for PT Aneka Gas Industri Tbk have remained relatively stable over the three-year period. The company experienced profitability during 2020 and 2021, as the contribution margin exceeded the total fixed costs. However, the contribution margin decreased in 2022, indicating a potential decline in profitability. Moreover, the break-even point analysis demonstrates that the company's sales volumes exceeded the break-even point in all three years. This suggests that the company was able to generate profits despite a decrease in the profit margins obtained. However, the break-even point increased annually, which could pose challenges to maintaining profitability in the future.Furthermore, the margin of safety analysis shows a fluctuating trend. Although the margin of safety increased in 2021, it declined in 2022 due to an increase in the break-even point. This implies a reduced safety cushion against sales declines, indicating a higher risk for the company's operations.
Keywords: break-even point, contribution margin, cost-volume-profit analysis, financial analysis, PT Aneka Gas Industri Tbk, Indonesia.

1. Introduction

The gas industry in Indonesia plays a crucial role in supporting various sectors of the economy, including manufacturing, agriculture, medical, construction, and energy (Candra et al., 2023). This sector is also impacted by Covid 19, because the Indonesian government has implemented social distancing and stricting the mobility of people to prevent the spreading of viruses in 2020 and 2021. As a result of that policy, the economic growth of Indonesia is decreasing. Based on Badan Pusat Statistik (BPS) data, the year on year GDP is in negative numbers during Q2 2020 - Q1 2021 with the lowest growth happening on the Q2 2020 (start of pandemic) with -5.32%.

Meanwhile, the development of the Indonesian oil and gas industry during 2022, in terms of oil and gas lifting performance, continues to decline gradually. The decline in upstream oil and gas production was mainly due to aging oil and gas wells and main oil and gas production facilities (Anupong et al., 2023). In addition, there is also low investment, especially in new exploration activities. Thereby it has an impact on the discovery of new limited production sources marked by the lower level of exploration success ratio.

PT Samator Indo Gas Tbk (AGII) is a leading industrial gas company and dominates 44% industrial gas market share in Indonesia based on “Indonesian Gas Report ", published by gas world. AGII operates 55 plants and more than 106 filling stations across 28 provinces in Indonesia. Established in 1916, the main business of the company is producing, marketing and selling various gasses for industry and related products in the Republic of Indonesia in the form of liquefied gas or solid gas. Aside from that, the Company trades gas products from other producers to customers, particularly for products such as Specialty Gas, Rare Gas and many more. The Company also provides construction and installation services needed to distribute such gas products, as well as other related supporting equipment and technology.

Fluctuations caused by economic conditions in the world have resulted in the price of raw materials and the purchasing power of company products fluctuating. This gives influence to the company in determining the price and volume of production. In its efforts to optimize operational performance and maximize profitability, PT Samator Indo Gas Tbk utilizes cost-volume-profit (CVP) analysis. CVP analysis is employed to understand the relationship between costs, sales volume, and company profits. By comprehending these interconnections, the company can make better strategic decisions regarding cost management, pricing, and profitability optimization.

2. Literature Review

2.1. Cost Profit Analysis

Cost Volume Profitability analysis has become a powerful instrument in the hands of policy makers to maximize the profits in the present scenario. The relationship between cost, revenue and profit at different levels may be expressed in graphs such as break-even charts, profit volume graphs or in various statements forms (Kavitha, 2018).

Profit depends on a large number of factors which are the cost of manufacturing, and the volume of sales. Volume of sales depends upon the volume of production and market forces which turn in related to costs (Fajrina et al., 2022). Management has no control over the market. In order to achieve a certain level of profitability, it has to exercise control over land management of costs, mainly variable cost. This fixed cost is a non-controllable cost. Departments have to make a better product mix for profit planning and to maximize the profit of a concern. These decisions can include such crucial areas as pricing policies, product mixes, market expansion or contractions, outsourcing contracts, idle plant usage, discretionary expense planning and a variety of other important considerations in the planning process.

Cost volume profit analysis is based on several assumptions, according to Martusa and Putri (2010):

1. Changes in the amount of products (or services) produced or sold can only lead to changes in income levels and costs.
2. Total cost can be divided into fixed components that do not change with the level of output and variable components that change with the level of output.
3. The behavior of total revenue and total cost is linear (in graph form).
4. The selling price, variable costs per unit, and total fixed costs are known and constant.
5. This analysis covers a single product or assumes that the proportions of different products change along with the company's unit sales level.
6. All revenues and expenses can be added, subtracted, and compared without taking into account the value and time of money.

This CVP analysis is used by business actors to understand the relationship that occurs for every change in costs and changes in sales volume to company profits. The result of this analysis is to assist management in profit planning and decision making so that the selling price, sales mix and set costs become more effective for the company. Not only that, this CVP analysis can also help management in maximizing the use of production facilities. The requirement for using CVP analysis by business actors is if business actors can determine 5 important components, namely selling price per unit (price per unit), variable cost per unit (variable cost per unit), fixed cost (fixed cost), sales volume (sales volume) and sales sales (sales mix).

2.2 Contribution Margin

Contribution is the difference between sales and variable cost or marginal cost of sales. It may also be defined as the excess of selling price over variable cost per unit (Navaneetha et.al 2017).

In short-term profit planning, contribution margins are helpful. If the contribution margin is greater than fixed costs (CM > FC), the company will make a profit, but if CM < FC, the company will incur a loss because the amount of profit available after deducting variable costs is not enough to cover the fixed costs. However, if CM = FC, the company will break even. A business must change sales prices,

increase sales quantity, and improve how it combines fixed and variable costs to increase contribution margins (Garrison et al., 2013).

Contribution Margin = Sales - Variable Cost.

2.3 Break Even Point

Break-even point defines when an investment will generate a positive return and can be determined graphically or with simple mathematics. Break-even point is where the subtraction of sales revenues and fixed & variable costs produce zero profits (Kampf et. al 2016).

This break even point analysis is an indicator that represents the point at which the turnover coming from production sales includes all variable costs related to sales volume and to fixed costs related to the period. In other words, the break even point corresponds to its level of activity (in terms of turnover or volume) at which the turnover obtained from the sale of production is equal to the cost, and the profit is zero, the starting point from which the company earns a certain profit so as to generate profitable activity (Trifan and Anton, 2011).

Profit = Fixed Cost + Variable Cost

2.4 Margin of Safety

Margin of Safety is the relationship between budgeted sales volume and sales volume at the break-even point. If the sales volume at the break-even point is known, and then linked to the budgeted sales, it will be possible to know the safety limit, namely how much the sales volume may decrease as long as the company does not suffer losses. The difference between the budgeted sales volume or a certain level of sales with the sales volume at the break-even point is the Margin of Safety (Fatmawatie 2021).

3. Method

This study used a quantitative descriptive approach. Sugiyono (2016) stated that descriptive research is research that describes certain symptoms, phenomena, or events. Ali Maksum (2012) states that descriptive research is research conducted to determine the value of independent variables, either one variable or more (independent), without making comparisons or relating them with other variables. The purpose of data collection is to obtain information about the phenomenon of co-study This study aims to determine the Cost Volume Profit (CVP) in PT. Aneka Gas Industri Tbk.

According to Sugiyono (2019), secondary data is a source that does not directly provide data to data collection; this includes written documents and information related to the research subject and published on the Indonesia Stock Exchange from 2020 to 2022.

Several data collection techniques were used by researchers in this study. Documentation techniques are methods that have been used previously to collect data for this study. This data is collected from financial reports, annual reports, and company summaries on the Indonesia Stock Exchange website, www.idx.co.id. The literature study method collects data from sources such as the internet, journals, or books.

The data analysis used in this study is Cost Volume Profit (CVP) analysis. The stages of Cost Volume Profit (CVP) analysis are as follows: First is to calculate fixed costs. Second is to calculate variable costs. Third, calculate the Contribution Margin. The fourth calculates the Break Even Point. Fifth, calculate the Margin of Safety. Sixth, calculate profit targets.

4. Results and Discussion

Sales data at PT Aneka Gas Industri Tbk.

Changes in sales volume affect operating profit and total costs. If the production volume exceeds the production capacity, the costs incurred will be greater and cause losses to business entities.
Table 1. Sales data of PT Aneka Gas Industri Tbk from 2020 to 2022 can be seen in the following table:

Year	Sales (Millions Rupiah)
2020	2.188.179
2021	2.738.813
2022	2.612.464

Source: Financial Report of PT Aneka Gas Industri Tbk

Classification of Fixed Costs and Variable Costs of PT Aneka Gas Industri Tbk

Changes in variable costs per unit will affect operating profit and total costs. Changes in variable costs per unit of product will also affect contribution margins and break-even points. A decrease in variable costs per unit will raise the break-even point, and vice versa. Any decrease and increase in total fixed costs will determine the appropriate sales volume to achieve the desired profit.

Table 2. The classification of fixed costs and variable costs of PT Aneka Gas Industri Tbk in 2020 to 2022 can be seen in the following table:

Year	Fixed Cost (Millions Rupiah)	Variable Cost (Millions Rupiah)
2020	928.888	1.254.746
2021	1.021.510	1.507.448
2022	1.044.419	1.456.948

Source: Financial Report of PT Aneka Gas Industri Tbk

4.1 Contribution Margin PT Aneka Gas Industri Tbk

The contribution margin is the difference between all variable costs and sales revenue. It is obtained by subtracting variable costs of production and non-production from sales, and then used to cover fixed costs. The rest will be profit (Carter and Usry, 2005).

a. Contribution Margin Calculation

Year 2020

Contribution margin = Sales – variable cost
= 2.188.179 - 1.254.746
= 933.433

Year 2021

Contribution margin = Sales – variable cost
= 2.738.813 - 1.507.448
= 1.231.365

Year 2022

Contribution margin = Sales – variable cost
= 2.612.464 - 1.456.948
= 1.155.516

b. Contribution Margin Ratio

Year 2020

$$\text{Contribution margin ratio} = \frac{\text{Contribution margin}}{\text{Sales}} = \frac{933.433}{2.188.179} = 42{,}66\%$$

Year 2021

$$\text{Contribution margin ratio} = \frac{\text{Contribution margin}}{\text{Sales}} = \frac{1.231.365}{2.738.813} = 44{,}96\%$$

Year 2022

Contribution margin ratio = Contribution margin

$$= \frac{\text{Sales}}{1.155.516}$$
$$= \frac{1.155.516}{2.612.464}$$
$$= 44,23\%$$

c. Net Profit

2020

Net Profit = Contribution Margin - Total Fixed Costs
= 933.433 - 928.888
= 4.545

2021

Net Profit = Contribution Margin - Total Fixed Costs
= 1.231.365 - 1.021.510
= 209.855

2022

Net Profit = Contribution Margin - Total Fixed Costs
= 1.155.516 - 1.044.419
= 111.097

d. Analysis of the results of Contribution Margin and Contribution Margin Ratio at PT. Aneka Gas Industri Tbk

Contribution margin analysis is used to determine the amount of contribution margin on the products produced so that the owner or management of the company can find out how the production ability contributes to generating profits.

Table 3. Contribution Margin and Contribution Margin Ratio at PT. Aneka Gas Industri Tbk Year 2020-2022

Year	Sales (Million Rupiah)	Contribution Margin (Million Rupiah)	Ratio Contribution Margin	Net profit (Million Rupiah)
2020	2.188.179	933.433	42,66%	4.545
2021	2.738.813	1.231.365	44,96%	209.855
2022	2.612.464	1.155.516	44,23%	111.097

Source: Financial Report of PT. Aneka Gas Industri Tbk. Data processed 2023

The results of the analysis conducted using cost volume profit analysis are known to have contribution margins from 2020 to 2022 of 933,433, 1,231,365, 1,155,516 respectively and contribution margin ratios of 42.66%, 44.66%, and 44.23%, respectively. With fixed costs from 2020 to 2022 of 928,888, 1,021,510, and 111,097, respectively. From the data above, it can be concluded that the contribution margin at PT. Aneka Gas Industri Tbk always experiences fluctuations from 2020-2021. The decrease in contribution margin to the company is caused by the company's sales volume every year which has decreased. Although in 2017 the company's sales volume had increased which affected the contribution margin obtained also increased. In addition, the costs incurred by the company have also increased, especially in variable costs.

4.2 Break Even Point PT. Aneka Gas Industri Tbk

Break Even Point analysis, also known as the "break-even point", is a tool often used by management when making decisions on issues such as price, cost, production volume, sales, and profits. Managers can find break-even points that indicate sales and production volumes that do not result in losses or profits (Daryani, 2011). The following is the calculation of BEP from PT Aneka Gas Industri Tbk.

Year 2020

$$\text{BEP (Rupiah)} = \frac{FC}{1-VC/S}$$

$$= \frac{928.888}{1-0,57}$$
$$= 2.177.524$$

Year 2021

$$\text{BEP (Rupiah)} = \frac{FC}{1-VC/S}$$
$$= \frac{1.021.510}{1-0,55}$$
$$= 2.272.052$$

Year 2022

$$\text{BEP (Rupiah)} = \frac{FC}{1-VC/S}$$
$$= \frac{1.044.419}{1-0,56}$$
$$= 2.361.289$$

Table 4. Recapitulation of Break Even Point at PT. Aneka Gas Industri Tbk Year 2020-2022 (Million Rupiah)

Information	2020	2021	2022
Fixed costs	928.888	1.021.510	1.044.419
Variable costs	1.254.746	1.507.448	1.456.948
Sales	2.188.179	2.738.813	2.612.464
BEP	2.177.524	2.272.052	2.361.289

Source: Financial Report of PT. Aneka Gas Industri Tbk. Data processed 2023

The calculation of break even points in 2020 - 2022 respectively shows sales results of 2,188,179, 2,738,813 and 2,612,464 are below the breakeven point with values of 2,177.52, 2,272,052 and 2,361,289, in this condition the company shows that sales conditions are very good because the large sales figures in that year have exceeded the break-even point of the company, so that the company can get profitability.

4.3 Margin of Safety PT. Kimia Farma Tbk

Management often uses break-even analysis when making decisions on issues such as price, cost, production, and sales volume and profits to find out if the company is not incurring losses or making profits.

1. Perhitungan Margin of Safety

   Year 2020

   Margin Of Safety (MOS) = Total Sales – Break-even Point
   = 2.188.179 - 2.177.524
   = 10.655

   Year 2021

   Margin Of Safety (MOS) = Total Sales – Break-even Point
   = 2.738.813 - 2.272.052
   = 466.761

   Year 2020

   Margin Of Safety (MOS) = Total Sales – Break-even Point
   = 2.612.464 - 2.361.289
   = 251.175

2. Rasio Margin of Safety

Year 2020

$$\text{Margin of Safety Ratio} = \frac{\text{Margin of Safety}}{\text{Total Sales}} \times 100\% = \frac{10.655}{2.188.179} \times 100\% = 0{,}49\%$$

Year 2021

$$\text{Margin of Safety Ratio} = \frac{\text{Margin of Safety}}{\text{Total Sales}} \times 100\% = \frac{466.761}{2.738.813} \times 100\% = 17{,}04\%$$

Tahun 2022

$$\text{Margin of Safety Ratio} = \frac{\text{Margin of Safety}}{\text{Total Penjualan}} \times 100\% = \frac{251.175}{2.612.464} \times 100\% = 9{,}61\%$$

The margin of safety will show the maximum limit of the decrease in sales volume that will not cause company losses. The greater the margin of safety, the condition of the company is not in danger, on the other hand, if the margin of safety is smaller, it means that the company is in danger or will experience a break even

Table 5. Margin of Safety and Margin of Safety Ratio at PT. Aneka Gas Industri Tbk Year 2020-2022

Year	Sales	Margin of Safety	Margin of Safety Rasio
2020	2.188.179	10.655	0,49%
2021	2.738.813	466.761	17,04%
2022	2.612.464	251.175	9,61%

Source: Financial Report of PT. Aneka Gas Industri Tbk, Data processed 2023

It can be seen that the table above shows that the higher the margin of safety value, *the higher the company's* margin of safety *ratio*. The higher the percentage of *margin of safety* generated, the safer the company's situation because there is little risk of breaking even. *The margin of safety* obtained by the company PT. Aneka Gas Industri Tbk fluctuates from year to year. In 2021, the *margin of safety* has increased. However, in the following year it declined again. The decrease in the *margin of safety* is caused by an increase in the company's break-even point from year to year. This causes the number of limits for decreasing company sales to be smaller, which means the level of company security in operational activities is also lower.

5. Conclusion

Conclusion

Based on data analysis that has been carried out at PT Aneka Gas Industri Tbk, the following conclusions can be drawn:

1. The contribution margin from 2020 to 2022 was 933,433, 1,231,365, 1,155,516 respectively and the contribution margin ratios were 42.66%, 44.96%, and 44.23%, respectively. In 2020-

2021, the contribution margin is greater than fixed costs, so the company experiences profitability.

2. The results of the break even point analysis show that PT. Aneka Gas Industri Tbk is increasing from year to year. The results show that the company's sales volume is greater than the break even point. Where the business can still achieve sales above break-even sales, so that it can still generate profits even though the profits obtained decrease.
3. Based on the results of this five-year safety margin analysis, PT. Aneka Gas Industri Tbk will decline in 2022. As the break-even point of the company increases year after year, there is a decrease in the margin of safety. This causes the limit of sales decline to be smaller, which means the level of business security in operational activities is also lower. The lower the sales decline limit, the more likely the business will incur losses.

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