2 Simple Break-Even Point Application

B.E.P. is explained in the following example, the case of Best Ltd. This company produces and sells quality pens. Its fixed costs amount to €400,000 approximately, whereas each pen costs €12 to be produced. The company sells its products at the price of €20 each. The revenues, costs and profits are plotted under different assumptions about sales in the break-even point graph presented below. The horizontal axis shows sales in terms of quantity (pens sold), whereas expenses and revenues in euros are depicted in vertical axis. The horizontal line represents fixed costs (€400,000). Regardless of the items sold, there is no change in this value. The diagonal line, the one that begins from the zero point, expresses the company's total revenue (pens sold at €20 each) which increases according to the level of production. The other diagonal line that begins from €400,000, depicts total costs and increases in proportion to the goods sold. This diagonal shows the cost effect of variable expenses. Revenue and total cost curves cross at 50,000 pens. This is the break even point, in other words the point where the firm experiences no profits or losses. As long as sales are above 50,000 pens, the firm will make a profit. So, at 20,000 pens sold company experiences a loss equal to €240,000, whereas if sales are increased to 80,000 pens, the company will end up with a €240,000 profit.

The following table shows the outcome for different quantities of pens sold (Diagram 1):

Pens Sold (Q)	20,000	50,000	80,000
Total Sales (S)	€400,000	€1,000,000	€1,600,000
Variable Costs (VC)	€240,000	€600,000	€960,000
Contribution Margin (C.M.)	€160,000	€400,000	€640,000
Fixed Costs (FC)	€400,000	€400,000	€400,000
Profit / (Loss)	(€240,000)	€0	€240,000

Diagram 1: Different quantities of pens sold

The break-even point can easily be calculated. Since the sales price is €20 per pen and the variable cost is €12 per pen, the difference per item is €8. This difference is called the *contribution margin per unit* because it is the amount that each additional pen contributes to profit. In other words, each pen sold offers €8 in order to cover the fixed expenses. In our example, fixed costs incurred by the firm are €400,000 regardless of the number of sales. As each pen contributes €8, sales must reach the following level to offset the above costs (Diagram 2):

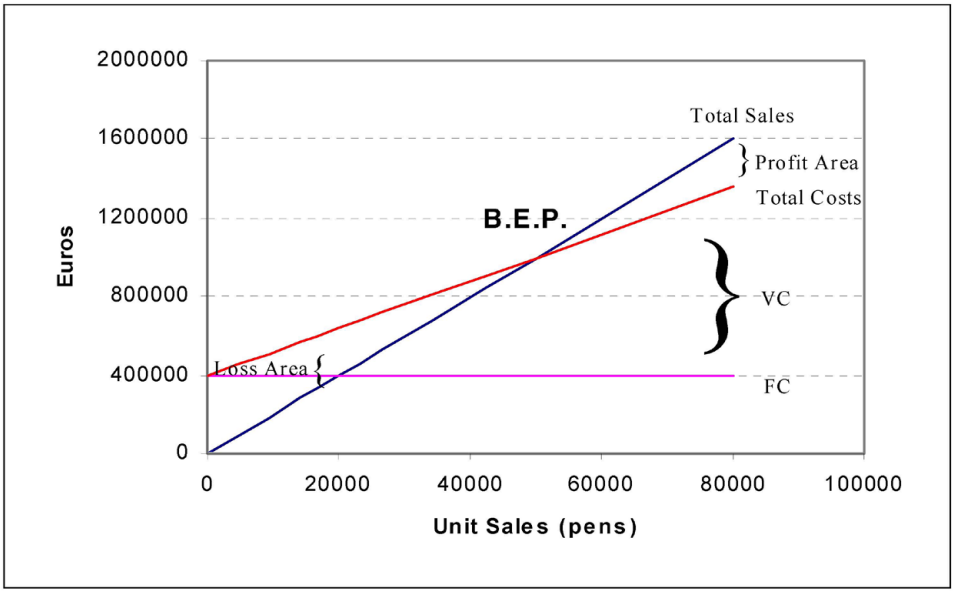

Diagram 2: Break-Even Point Graph

$$\frac{\text{Fixed Costs}}{\text{Selling Price - VC (u)}} = \frac{\text{Fixed Costs}}{\text{Contribution Margin}} = \frac{€\,400000}{€\,8} = 50000 \text{ pens (B.E.P)}$$

Thus, 50,000 pens is the B.E.P. required for an accounting profit.

Break-even analysis can be extended further by adding variables such as tax rate and depreciation to our calculations In any case, it is a useful tool because it helps managers to estimate the outcome of their plans. This analysis calculates the sales figure at which the company (or a single project) breaks even. Therefore, a company uses it during the preparation of annual budget or in cases of new product development. The B.E.P. formula can be also used in the case where a company wants to specify the exact volume of sold items required to produce a certain level of profit.

Finally, the marketing-controlling departments of an enterprise may use break-even analysis to estimate the results of an increase in production volume or when evaluating the option of investing in new, high technology machinery. In that case, the firm may operate more automatically, fewer workers will be needed and what finally happens is that variable costs are substituted by fixed ones. This will be examined later in this chapter.