

#5

C O S T - B E N E F I T A N A L Y S I S

Calculated Choices



CPA... Imagine the possibilities!

Learning Activity

Understanding Economic and Environmental Factors: *Students compare the economic and environmental benefits and costs of two power plants to determine which plant is preferred from both an environmental and financial point of view.*

Learning Objectives

1. Assess and evaluate multiple variables (environmental) in a given scenario that affect the financial impact of a decision.
2. Use compiled financial information to make strategic decisions.

Academic Standard

“Students understand measurable attributes and apply appropriate techniques, tools, and formulas to determine measurements.” (NCTM)

“Students identify opportunity costs and trade-offs involved in making choices about how to use scarce economic resources.” (NBEA)

Assessment

Students will: (1) calculate the average yearly cost of two power plants, (2) calculate the average yearly revenue of two power plants, (3) calculate the average yearly gross profit of two power plants, and (4) determine the number of years it will take to recover the initial investment of each power plant.

Business Skill

Global Decision-Making: Business decisions are multifaceted and require the consideration of both challenges and opportunities. CPAs, utilizing their broad business knowledge and experience, assist companies in analyzing situations to improve the decision-making process.

Procedure

Distribute a copy of the Topic Overview to your students and discuss the importance of considering all of the facts and information available and relevant in making a business decision.

Explain the emphasis placed on protecting the environment from harmful manufacturing processes and by-products and the potential risks and consequences of minimizing the impact that they may have on the environment. In addition, explain that Environmental Accounting is an area that CPAs specialize in.

Distribute copies of Activity #5 to your students. Have students consider both power plants and calculate the average total cost, revenue, and gross profit, as well as the number of years it will take to recover the initial investment for each alternative.

Use the financial information to reach a decision that is both environmentally and financially ideal.

TEACHING-TIPS

For a complete lesson and activity on the services provided by CPAs, see Activity #12, *A Day in the Life*.

Overview

In business, individuals and companies must have access to information—reliable, accurate and timely information—in order to be competitive and successful. A recent trend in today's dynamic and demanding world of business is access to information about the environment and the costs associated with preserving, or not contaminating, it. The increasing importance of environmental information, due to the large potential costs or savings that it provides, has in turn become one of the new growth areas in the accounting profession. In particular, **Certified Public Accountants (CPAs)**, because they possess acute business acumen and abide by the highest professional and ethical standards of conduct, are being engaged by all types of companies to implement environmental accounting practices into the companies' existing accounting systems.

A CPA that specializes in environmental accounting is charged with identifying and allocating costs—especially those that have traditionally been assigned to “miscellaneous” categories—to products or services associated with those costs. In addition, environmental accounting involves identifying the sometimes hidden or ambiguous costs that a company imposes on the environment or on society that go unaccounted for in traditional financial reporting procedures.

The main financial advantage provided by environmental accounting is the assignment of more accurate costs to a company's products or services, which in turn leads to more accurate pricing strategies, as well as more efficient

management practices. For instance, improved financial information aids in strategic and marketing decision making, helps identify opportunities for minimizing costs and seizing profitable alternatives, and assists management in achieving long term profitability.

More importantly, however, environmental accounting enhances the “environmental performance” of all companies. The many environmental advantages of this CPA service includes ensuring that environmental compliance requirements are identified and met, improving—or minimizing—the environmental impact of a company's operation, minimizing liability risks, and improving shareholder and societal satisfaction and confidence.

CPAs are engaged to analyze—in financial and environmental terms—possible options and alternatives with respect to planning, constructing, and operating energy producing facilities such as electric power plants. As part of this business activity, CPAs prepare cash flow projections, budgets and forecasts, risk assessments, and operating and profitability reports, while considering and incorporating into their analysis the environmental pros and cons of each alternative. It is the combination of the CPAs' financial and business knowledge and ability to service varied and unique companies and industries that has contributed to the CPAs' increased popularity among environmentally conscious organizations.



Activities

Metro-Electric (ME), a regional utility company, is expanding its operations and wishes to do so in an environmentally safe and financially rewarding manner. ME is considering purchasing an existing power plant in the Northeast, or building a new state of the art power plant in the Southwest.

As a Certified Public Accountant specializing in environmental accounting in the utility industry, ME has asked you to determine which alternative is best financially, while considering the environmental impacts of each.

Using the following data and the chart on the next page, make a recommendation to ME as to which option—the Northeast Power Plant or the Southwest Power Plant—is financially and environmentally best.

OPTION-1: The Northeast Power Plant

- The purchase price is \$750 million, which will be expensed equally over 15 years.
- The power plant was built a number of years ago and as such, does not meet current standards set by the Environmental Protection Agency (EPA). As a result, ME will be required to expend \$550,000 a month in maintenance and operating costs to meet EPA standards.
- The plant will also be subject to monthly inspections by the EPA that will cost ME \$150,000 per inspection.
- ME anticipates an "overload" penalty with the Northeast plant. The Northeast Power Plant is capable of operating 20 hours a day. ME will need to operate the plant in excess of 20 hours a day on occasion to meet the needs of its customers. As a result, ME estimates monthly penalties of \$350,000.
- ME has agreed to contribute \$4.5 million a year to the EPA to research new ways of preventing air pollution.
- With the Northeast Power Plant, ME will be able to provide service to 120,000 homes and estimates the average yearly revenue from each home to be \$900.



OPTION-2: The Southwest Power Plant

- The new facility would cost \$2.1 billion to build, which would be expensed equally over 30 years, rather than 15 years, because it is a brand new facility.
- Since the Southwest Power Plant will be a state of the art power plant, it will meet all EPA standards, which means ME would avoid monthly maintenance costs and EPA penalties.
- The Southwest Power Plant would still be subject to inspections, but one every two months rather than once a month. Inspections by the EPA will cost \$150,000 per inspection.
- ME will make a contribution to the EPA of \$1 million a year for research and development.
- The Southwest Power Plant would allow ME to service 240,000 homes and, due to the technological advances of the new facility, would be able to service each home at a reduced fee of \$775 per year on average.



Environmental & Economic Issues	Northeast Power Plant Yearly Forecast	Southwest Power Plant Yearly Forecast
Costs		
Expensing Initial Cost	\$	\$
EPA Inspections	\$	\$
EPA Standards, Maintenance & Operating Costs	\$	\$
Contributions to EPA	\$	\$
Operating Penalties	\$	\$
Average Total Costs	\$	\$
Revenue		
Number of Homes Serviced		
Average Revenue per Home per Year	\$	\$
Average Total Revenue	\$	\$
Average Profit	\$	\$
Number of Years to Recover Initial Cost		

Recommendation _____

Answers

Environmental & Economic Issues	Northeast Power Plant Yearly Forecast	Southwest Power Plant Yearly Forecast
Costs		
Expensing Initial Cost	\$50,000,000	\$70,000,000
EPA Inspections	\$1,800,000	\$900,000
EPA Standards, Maintenance & Operating Costs	\$6,600,000	\$0
Contributions to EPA	\$4,500,000	\$1,000,000
Operating Penalties	\$4,200,000	\$0
Average Total Costs	\$67,100,000	\$71,900,000
Revenue		
Number of Homes Serviced	120,000	240,000
Average Revenue per Home per Year	\$900	\$775
Average Total Revenue	\$108,000,000	\$186,000,000
Average Profit	\$40,900,000	\$114,100,000
Number of Years to Recover Initial Cost	18.4 years	18.4 years

RECOMMENDATION TO METRO-ELECTRIC:

The “new” facility, the Southwest Power Plant, is the best option—financially and environmentally. It will generate a gross profit of \$114.1 million per year, versus the existing plant, the Northeast Power Plant, which will generate a gross profit of \$40.9 million per year. In addition, despite having a greater initial cost (\$2.1 billion versus \$750 million), the Southwest Power Plant will generate sufficient profit to recover the initial cost in the same time (18.4 years) that it would take the Northeast Power Plant to recover its cost or purchase price. This is true because the Northeast Plant does not meet current EPA standards and, as such, would cause Metro-Electric to incur additional costs to meet those standards. In comparison, the Southwest Plant will be a state-of-the-art power plant that meets all current EPA standards, thus allowing Metro-Electric to avoid additional expenses and EPA penalties.