
Course Learning Outcomes for Unit VII

Upon completion of this unit, students should be able to:

4. Evaluate economics of pollution prevention strategies.

Reading Assignment

In order to access the resource below, you must first log into the myCSU Student Portal and access the Academic Search Complete database within the CSU Online Library.

Bialowas, Y. D., Sullivan, E. C., & Schneller. (2006). Designing a low-cost pollution prevention plan to pay off at the University of Houston. *Journal of the Air & Waste Management Association*, 56(9), 1320-1324.

In order to access the resource below, you must first log into the myCSU Student Portal and access the Academic OneFile database within the CSU Online Library.

Harrington, D. R. (2013). Effectiveness of state pollution prevention programs and policies. *Contemporary Economic Policy*, 31(2): 255-278.

Unit Lesson

The past three units have focused on pollution prevention (P2) in particular industries – construction, electronics, coal-fired power plants, dry cleaning, hydraulic fracturing, pulp and paper, and concrete paving. Through the presentation of a diverse array of industries, you have gained familiarity with the variety of P2 opportunities available.

With the previous three units focusing on specific industries, Unit VII takes a broader approach. Unit VII discusses economics of P2. Economics is present in any decision related to P2. For a company to even consider hiring a P2 manager, economics is a major factor. Will the P2 manager and his or her decisions have an economic benefit to the company? A company needs to take a long view on P2. Hiring a P2 manager and implementing his or her recommended programs may not benefit the company in a year, maybe not even three years.

As the P2 mindset is woven into corporate decision-making, less waste will be generated and fewer hazardous chemicals will be used. This ultimately will lead to better corporate economics. In addition, a good P2 manager will anticipate environmental regulations and keep the company in compliance in order to avoid fines, while possibly receiving praise from regulators. A good corporate environmental image will also keep customers feeling good about using the company's products.

The assigned articles discuss the economics of a P2 plan at the University of Houston and the effectiveness of state P2 policies. While the articles contain considerable detail, the remainder of this lecture will present a simplified scenario of P2 economics.

As an example, let's say a company decides to hire a P2 contractor for a period of one year to implement P2 changes in a small manufacturing facility. The contractor is hired at a cost to the company of \$90,000.

The P2 contractor recommends process changes that cost \$40,000. The cost is due to changing the space layout so that less toxic chemicals can be stored and for making test runs of the equipment using the less toxic chemicals. If the changes are producing the same or better quality product, then using less toxic chemicals can eliminate the previous costs of cleaning up hazardous spills and the cost of maintaining an

area for hazardous chemical storage. If the P2 changes result in a savings of \$10,000 per year, then economics can be used to compare the P2 contractor's cost to the company's savings in plant operations.

The P2 contractor is only hired for one year and the \$40,000 of changes are a one-time expense. Thus, after the first year, the company has spent $\$90,000 + \$40,000 = \$130,000$.

In the second year, the P2 contractor is no longer working for the company, and the company is seeing \$10,000 a year worth of savings due to the P2 modifications. After the second year, the company's expenses are still a total of \$130,000, but the savings (compared to using the previous plant's process) are \$10,000. Thus, the company has spent \$120,000 since hiring the P2 contractor.

At the end of the third year, the company has spent $\$130,000 - 2(\$10,000) = \$110,000$.

At the end of the fourth year, the company has spent $\$130,000 - 3(\$10,000) = \$100,000$.

At the end of the fifth year, the company has spent $\$130,000 - 4(\$10,000) = \$90,000$.

The equation is:

Total Spending after year 5 = $\$130,000 - (5-1)(\$10,000) = \$90,000$

Or in general after year i (where S_i =Spending after year i),

$S_i = \$130,000 - (i-1)(\$10,000)$ Equation 1

For instance, after year 10 ($i=10$):

$S_{10} = \$130,000 - (10-1)(\$10,000) = \$40,000$

The year at which the company has recovered its expenses is determined by setting $S_i=0$ and solving for i in Equation 1. Using algebra on Equation 1:

$(i-1)(\$10,000) = \$130,000 - S_i$

$i(\$10,000) - \$10,000 = \$130,000 - S_i$

$i(\$10,000) = \$140,000 - S_i$

$i = (\$140,000 - S_i) / \$10,000$

Then, with $S_i = 0$:

$i = (\$140,000 - 0) / \$10,000 = 14 \text{ years.}$

As a check,

$S_{14} = \$130,000 - (14-1)(\$10,000) = \$0$

Thus, 14 years after the P2 manager was hired, the company has recouped its investment, and can profit from the changes in forthcoming years.

We have presented a simple example of the economics of a P2 program. Programs will take longer or shorter to pay off. Indeed, some P2 programs may not pay off and may need to be abandoned. In that case, an emphasis on up-front planning and hiring knowledgeable staff is crucial.

Please take your time reading the assigned articles so that you can appreciate the details of pollution prevention economics.