

Guidance for Worksheet 9 – Financial Analysis

Once a pollution prevention opportunity is determined to be technically feasible, it still must be shown to be economically viable. Vermont's pollution prevention law only requires companies to establish a performance goal for implementation when an opportunity is shown to be **both** technically and economically feasible.

For opportunities that you know make technical and economic sense to implement, there is no need to complete Worksheet 9. Please go to Worksheet 10 - Selected Opportunities and Performance Goals.

The depth of your economic analysis should be geared to the extent it is needed. For instance, if the avoidance of hazardous waste disposal costs (usually relatively easy to obtain) is enough to economically justify investment in a pollution prevention measure, there may not be any reason to do an extended financial analysis.

Depending on the project, financial assessment can have three phases:

- Collecting relevant cost information,
- Calculating differential cash flows for each year of the project, and
- Applying a measure of profitability (like payback or net present value) to cost information

Worksheet 9 takes you through an abbreviated financial analysis. It emphasizes cost identification from which cash flow(s) can be determined and used to calculate a simple payback period. It does not explain how to calculate key concepts such as depreciation expense and after-tax cash flows, nor how to do a net present value (NPV) analysis. Please call the Environmental Assistance Office for more information on the financial analysis of pollution prevention projects.

Financial analysis is only as realistic as the cost information it employs. Worksheet 9 shows potentially relevant operating and capital costs. Operating costs continue over the lifetime of the project whereas capital costs are the initial costs (e.g. purchase, installation, start-up). If there are no significant capital costs involved, then the financial analysis only examines operating costs. A goal of the Worksheet is to minimize the chance for rejection of a pollution prevention opportunity because all relevant costs are not considered. Conventional cost accounting practices usually "bury" environmental operating costs, like the costs of waste management or regulatory compliance, in overhead accounts that not only don't show line item costs for these expenditures but also typically bear no relation to the waste generating process.

Cost information is calculated as the *annualized difference* between the costs of the current process and the projected costs of the proposed process or project. Begin with an assessment of current annual operating costs. Then estimate the change in operating costs associated with the proposed project. The difference, including either savings or expenditures, is summed with other operating costs that would result from the project in year "x" to yield net annual operating cash flow.

Any capital costs associated with the project should be shown on the Worksheet. Capital costs are one-time expenditures incurred at the beginning of the project, often for the purchase and implementation of pollution prevention equipment. Capital costs represent a significant cash outflow that must be offset by cash inflows resulting from the project over its economic lifetime. Economic lifetime is the number of years over which cash flows are expected to occur as a result of the investment and does not always correspond to physical lifetime, as could happen when technology changes render a piece of equipment obsolete. *Depreciation* is shown as an operating expense where capital costs have been incurred. As a non-cash expense, depreciation is a source of cash flow because annual depreciation charges decrease taxable income, and thus the tax that isn't paid represents a cash savings.

After relevant costs and savings have been identified and translated into annual cash flow(s), the potential value that a pollution prevention project might add to a business can be assessed by using a measure of profitability like payback period or net present value. The payback calculation on the Worksheet assumes that net operating cash inflow (savings) will remain the same in future years (assuming such inflows are expected to result from the project).

Payback period analysis reveals the amount of time needed for an investment to return the initial capital expenditures. It is a simple calculation that divides the investment by expected annual savings. For many businesses, payback periods of two to three years are seen as good investments. The biggest drawback of payback analysis is that it ignores the time value of money, that is, payback assumes that savings are the same each year even though, for example, avoided environmental compliance costs might be much greater in year 5 of the project than in year 1. Payback does provide a useful assessment of a project's attractiveness however, and if the payback period is short, it may be all you need.

Net present value (NPV) relies heavily on the concept of the time value of money. This method recognizes that \$100 today is not equivalent to receiving \$100 at some point in the future. Therefore, NPV reveals the present value of all the cash flows resulting over the economic lifetime of the project. It relates the present value of future cash inflows to the initial investment (ie. in today's dollars). Cash flows in the far future are discounted a lot and those in the near future are discounted proportionately less. Discounted cash flows are summed up to give the net present value of a project; if the sum is greater than zero, it is considered an acceptable investment.

Lastly, the financial analysis of a pollution prevention project may be augmented by the evaluation of "qualitative" factors, difficult to quantify, but important, nonetheless. Examples of less tangible costs that may be appropriately considered include improved public image, market share (consumer acceptance), avoided financial or environmental liability, improved worker health and safety, and increased employee retention and morale.

FINANCIAL ANALYSIS – EXAMPLE

The Vermont Autobody Repair Company is considering a project to reduce the cost of purchasing and disposing of waste thinner. Thinner is used to clean painting equipment used in their two full-sized spray booths. The company has already implemented source reduction techniques including the use of HVLP guns, an automatic gun-cleaning station and improved housekeeping practices. The shop manager is considering the installation of a recovery still to recycle used thinner on site. He estimates that the still, which costs \$3000, will reduce the purchase of virgin thinner by 90%.

Distillation of Used Thinner	Current Cost	New Process Cost	Differential (Cost) or Savings
OPERATING COSTS			
Raw Materials Thinner: 10 drums/yr to 1 drum/yr @ \$275/drum	\$2,750	\$275	\$2475
Waste Disposal 6 drums/yr @ \$108/drum vs. 1 drum still bottoms @ \$375	\$650	\$375	\$275
Regulatory Compliance manifesting reduced from 4 to 1 times/yr @ 1.5 hours x \$30/hr	\$180	\$45	\$135
Utilities operate still 8 hrs/wk x 4 kw/wk = 32 kw/wk or 1664 kw/yr x \$0.08/kwh = \$133	N/A	\$133	(\$133)
Depreciation 5 year straight line	N/A	\$600	\$600
Other fees – change in planning status from Class B to Exempt	\$300	\$0	\$300
Net Operating Cash Flow in Year 1 sum of all operating cost differentials			\$3652
CAPITAL COSTS (one time expenditures)			
Equipment Purchase		\$3000	(\$3000)
Installation & Start-up		\$340	(\$340)
Total Capital Costs			(\$3340)

Payback Period : Total Capital Costs / Net Operating Cash Flow

$$\$3340 / \$3652 = 0.9 \text{ years} = 11 \text{ months}$$

Worksheet 9 - Financial Analysis

- 1) Identify any operating costs likely to be affected with implementation of the pollution prevention project.
- 2) Calculate cost differential. The sum of cost differentials represents annual cash flow.
- 3) If capital costs are incurred, determine simple payback period.

Opportunity:			
	Current Cost	New Process Cost	Differential (Cost) or Savings
OPERATING COSTS			
Direct Labor			
Raw Materials (include chemicals & catalysts)			
Waste Management (include disposal, taxes, treatment, storage, on-site handling)			
Regulatory Compliance (include manifesting, reporting, monitoring, Plan fees, training, permitting, personal protective equipment)			
Utilities (electricity, steam, water, sewerage, etc)			
Depreciation (on capital equipment purchase)			
Other :(lab fees, supplies, insurance etc.)			
Net Operating Cash Flow in Year 1 (sum of all operating cost differentials)	N/A	N/A	
CAPITAL COSTS (one-time expenditures)			
Equipment purchase	N/A		
Installation & start-up	N/A		
Materials	N/A		
Other :(utility connections, site preparation, engineering, permitting, operator training and contingency)	N/A		
Total Capital Costs	N/A		
Payback Period: Total Capital Costs ÷ Net Operating Cash Flow =		_____ Years	
Check One:			
<input type="checkbox"/>	Opportunity is economically feasible and will be implemented	Go to Worksheet 10	
<input type="checkbox"/>	Opportunity requires further evaluation before selecting or rejecting	Go to Worksheet 10	
<input type="checkbox"/>	Opportunity not economically feasible		