

Recommendation

Sell paper waste directly to a local paper mill rather than to a third party vendor. This will generate \$7,478 in net revenue per year and reduce annual paper waste removal costs by 80%, resulting in net cash flow of \$11,140 per year.

Annual Savings Summary

<i>Source</i>	<i>Quantity</i>	<i>Units</i>	<i>Cash Flow</i>
Paper and Cardboard Waste	192,000	Pounds	\$7,488
Recycling Costs	192,000	Pounds	\$3,662
Electrical Consumption	-136	kWh (site)	-\$10
Net Cash Flow			\$11,140

Implementation Cost Summary

<i>Description</i>	<i>Cost</i>	<i>Payback (yrs)</i>
Implementation Cost	\$5,000	0.4

Facility Background

The facility currently recycles its paper and cardboard waste. From waste bills, analysts estimate that the facility recycles 120 tons of cardboard and paper waste per year and are charged \$4,578 annually for recycling fees, resulting in an average cost of \$38 per ton. The facility is working towards becoming a zero landfill facility and hopes to recycle all waste. A local paper mill is willing to purchase paper waste from the facility.

Technology Background

Paper mills utilize local resources of scrap cardboard and paper. By selling paper waste, the facility will be able to generate revenue from what would normally be recycled and reduce recycling costs. Separating waste into categories will also increase revenue as the mill pays less for mixed materials. A baler is required to create transportable bales of paper. Balers work by bunching paper waste into a large compacted brick shape bound with plastic cord.

Proposal

Separate paper wastes into different categories (paper bags, paper bags with lining, cardboard, etc.) and compact them using a baler. Sell the sorted paper waste bales to a local paper mill. The paper mill pays different rates for different grades of paper product thus separating the paper will generate the greatest profit.

Sell paper waste to achieve a net profit of \$11,140 per year, after an implementation cost of \$5,000 resulting in a simple payback period of 0.4 years.

Based on	Data Collection	Author	Orange Team Review	Black Team Review
<i>Original Template</i>	<i>Analyst Name</i>	<i>Analyst Name</i>	<i>Analyst Name</i>	<i>Analyst Name</i>
	<i>Analyst Name</i>			

Data Collected**Waste Data**

Paper and Cardboard Waste	(m_w)	120	tons/yr	(Rf. 1)
Percent Sellable Waste	(SF)	80%		(N. 1)
Current Recycling Costs	(C_C)	\$4,578	/yr	(Rf. 1)
Value of Mixed Paper Waste	(V)	\$100	/ton	(Rf. 2, N. 2)
Revenue from Paper	(R_P)	\$9,600	/yr	(Eq. 1, N. 2)
Paper Transport Cost	(C_T)	\$22	/ton	(Rf. 3)
Total Transportation Costs	(C_{TT})	\$2,112	/yr	(Eq. 2)
Baler Power	(E_B)	10	hp	(Rf. 4)
Paper Prep Time	(t)	18	hrs/yr	(N. 3)
Baler Energy Use	(E)	136	kWh/yr	(Eq. 3)
Incremental Energy Cost	(IC_E)	\$0.07544	/kWh	(Rf. 5)
Baler Energy Cost	(C_E)	\$10	/yr	(Eq. 4)
Net Revenue from Paper	(R_C)	\$7,478	/yr	(Eq. 5)

Implementation Cost Analysis**Material Cost**

Baler	(C_M)	\$5,000		(Rf. 4)
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Economic Results

Net Cash Flow	(S)	\$11,140	/yr	(Eq. 6)
Implementation Cost	(C_M)	\$5,000		(Rf. 3)
Simple Payback Period	(t_{PB})	0.4	yrs	(Eq. 7)

Notes

N. 1) Sellable waste estimated by analyst after discussion with facility personnel.

N. 2) Revenue calculated is based on mixed paper waste. Separating paper waste into categories will increase paper value up to \$120 per ton.

N. 3) Baler has a one minute cycle time and analysts estimate three cycles per day. This results in 18 operation hours per year.

Equations

Eq. 1) Revenue from Paper (R_P)

$$m_w \times V \times SF$$

Eq. 2) Total Transportation Cost (C_{TT})

$$SF \times C_T \times m_w$$

Eq. 3) Baler Energy Use (E)

$$E_B \times 0.746 \frac{kW}{hp} \times t$$

Eq. 4) Baler Energy Cost (C_E)

$$E \times IC_E$$

Eq. 5) Net Revenue from Paper (R_N)

$$R_P - C_{TT} - C_E$$

Eq. 6) Net Cash Flow (S)

$$R_N + (SF \times C_C)$$

Eq. 7) Simple Payback Period (t_{PB})

$$\frac{C_M}{S}$$

References

Rf. 1) Waste analysis is present in author's Site Report.

Rf. 2) Value of mixed paper waste obtained from local paper mill.

Rf. 3) Paper transportation cost quoted from a commercial recycler.

Rf. 4) Estimated cost and specifications of baler found on American Surplus Inc. (www.americansurplus.com).

Rf. 5) Energy cost developed in the Utility Analysis found in the Site Data section.