

LCA Homework

- 1) Your company is a manufacturer of computer workstations, currently producing the computer (CPU) and monitors (17 inch cathode ray tubes [CRTs]). Manufacturing is performed in Indonesia and shipped to the US. Your company is considering shifting its production to flat panel displays (FPDs). You've been tasked with determining the life cycle impact of the CRTs vs. the FPDs. The life of these displays (both CRTs and FPDs) is assumed to be 5 years and the average usage per monitor is 1,000 hrs per year. Identify the following:
- a) Product life, functional unit, and system boundaries
 - b) Bill of materials, including production, energy usage, transportation, and disposal
 - c) Calculate the impacts
 - d) What is the most significant impact and make a recommendation that would reduce that impact.

Assumptions and Major components:

CRT	FPD
• Plastic: PVC rigid, 20 lbs	• Plastic: Polycarbonate, 6 lbs
• Metal: aluminum, 5 lbs	• Metal: aluminum, 1 lb
• Metal: lead, 2 lbs	• Metal: lead, 0 lbs
• Metal: copper, 2 lbs	• Metal: copper, 2 lbs
• Integrated circuitry, 6 sq. inches, weight 0.5 lbs.	• Integrated circuitry, 24 sq. inches, weight 2 lbs.
• Glass, clear, 2.5 lb.	• Glass, clear, 0 lb.
• Packaging: brown cardboard, 1 lb.	• Packaging: brown cardboard, 1 lb.
• Power consumption during use: 260 Watt (remember, 1000 W = 1 kW) and these CRTs run 1,000 hours/yr	• Power consumption during use: 65 Watt (remember, 1000 W = 1 kW) and these CRTs run 1,000 hours/yr
• Transport: intercontinental container ship, 5000 miles	• Transport: intercontinental container ship, 5000 miles
• Manufacturing: injection molding for the PVC and aluminum extrusion for the aluminum	• Manufacturing: injection molding for the PVC and aluminum extrusion for the aluminum
• Disposal: product takeback by the manufacturer, so nothing to landfill, but must be shipped by 28-ton diesel truck, Avg. distance = 500 miles.	• Disposal: product takeback by the manufacturer, so nothing to landfill, but must be shipped by 28-ton diesel truck, Avg. distance = 500 miles.

Don't forget: when doing the calculations, the transportation impacts are based on the total weight and distance of the product being shipped. Also, make sure the units balance (e.g., Watts vs. Kilowatts, etc.)

a) Describe the product life, functional unit, and system boundaries (0.5 points)

b) Develop the Bill of Materials (can be done in table below)

c) Calculate impacts (4 points)
Suggested format:

Input	Amount		x	Factor <i>millipoints/unit</i>	=	Impact <i>millipoints</i>	
	CRTs	FPDs				CRTs	FPDs
Materials							
Plastic: Rigid PVC	20.00		lb.	33 /lb.		660.0	-

d) Analysis:

What are the biggest contributors to ecoimpact for the CRTs? Suggest a change that could reduce it further.

What are the biggest contributors to ecoimpact for the FPDs? Suggest a change that could reduce it further.