

Energy and Environmental Design Project

Green Manufacturing Facility – Company X

Mission Statement

Conduct research including a full cost benefit analysis for an innovative manufacturing facility that is fully functional and highly energy efficient.

Synopsis

The Company X team began with the idea of an innovative, efficient, and creative manufacturing plant that would use as much renewable energy as possible. This would be an ideal facility that would be as effective and efficient as it is environmentally friendly. It was decided that the company would be limited to two acres of land with a budget of five million dollars. The facility would also be making aluminum alloy wheels which would affect the manufacturing flow and therefore the company layout.

The most important task in this project was effectively planning what steps to accomplish before others. The team found that research on renewable energies, research on company sections, and designing a rough floor plan were the most important. They then selected what kinds of renewable energies to use and found information on estimated costs for installation.

They then refined the basic floor plans that were made by editing them in a CAD program. They also added additional parking spaces and a large area for trucks to pick up and drop off materials. With all of our space split into sections, they effectively organized the manufacturing floor for product flow in batches of four. This involved researching the type of wheels that would be made, the process for making them, and the cost of machines. These machines would then be roughly organized into stations and efficiently placed in the manufacturing section of the facility.

The proposed facility uses renewable energy for sixty percent of its energy consumption, fits within two acres with room to expand, and stays within our budget of five million dollars.

This project should continue for at least another year in order to refine the current layout, create a more in depth manufacturing flow, and include a full three dimensional virtual walkthrough of the facility.

Cooling		
	Sensible BtuH	Latent BtuH
▶ Window Transmission	4241	
Window Solar	27577	
Wall Transmission	13724	
Wall Solar	8475	
Roof Transmission	39749	
Roof Solar	80624	
Partition	0	
Floor	0	
Infiltration	0	0
Lights	158821	
People	15696	12600
Equipment	127167	0
Sub Total	476074	12600
Safety Factor	0	0
Sub Total	476074	12600
Ventilation	163819	226251
Total	639893	237851

Peak Loads		
	Cooling	Heating
Total Hourly Load: (BtuH)	877744	
Total Load: (BtuH)	877744	1026328
Total Load: (BtuH/ft²)	28.3	33.0
Total Load: (Ton)	73.1	
Total Load: (ft²/Ton)	424	



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