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ENGINEERING LEADERSHIP
DEVELOPMENT PROGRAM

ENGINEERING LEADERSHIP & DESIGN CASE COMPETITION

OCTOBER 2019



CAN BE ACCESSED AT: ECCPSU.COM/ELDCASE2019



BACKGROUND

ELECTRONIC WASTE

Electronic waste, or e-waste, refers to all items of electrical and electronic equipment (EEE) and its parts that have been discarded by its owner as waste without the intent of re-use. Usually, products reach the state of electronic waste by losing their utility value through breakage, fracture or obsoleteness. E-waste can include a wide range of products – almost any household or business item with circuitry or electrical components with power or battery supply. In 2016 alone, over 44.7 million metric tonnes of e-waste was generated, which is equivalent to 4,500 Eiffel Towers.

E-waste, although not commonly hazardous, can turn hazardous if its condition deteriorates and if it consists of materials that can decay. Sometimes, e-waste contains precious, recoverable materials that differentiate it from other forms of municipal wastes. Electronic waste has been highlighted as one of the Grand Challenges of Engineering revolving around restoring and improving urban infrastructure. The goal is to control the procurement of electronic waste, followed by eco-friendly disposal of any e-waste produced and finally discovering efficient methods of utilizing e-waste.

COMPANY PROFILE

GreenBell Home Appliances is a Fortune 500 appliance manufacturer headquartered in Decatur, Alabama. The multinational company is a pioneer in manufacturing high-quality home appliances for kitchen, laundry, and other home products. GreenBell is the leading manufacturer for commercial refrigerators in the United States (more of their top appliances can be found in the Key Facts section).

Their main campus is located in Decatur, Alabama – a 700-acre site, housing 8,500 employees. This campus is the location where the parts for their home appliances are produced, assembled and shipped. As a leading manufacturer of large scale home appliances that are sold to customers and other businesses, GreenBell values innovation, new product introduction and brand management – which are all fundamental to their overall company credo. More information about GreenBell can be accessed on their website: eccpsu.com/GreenBell

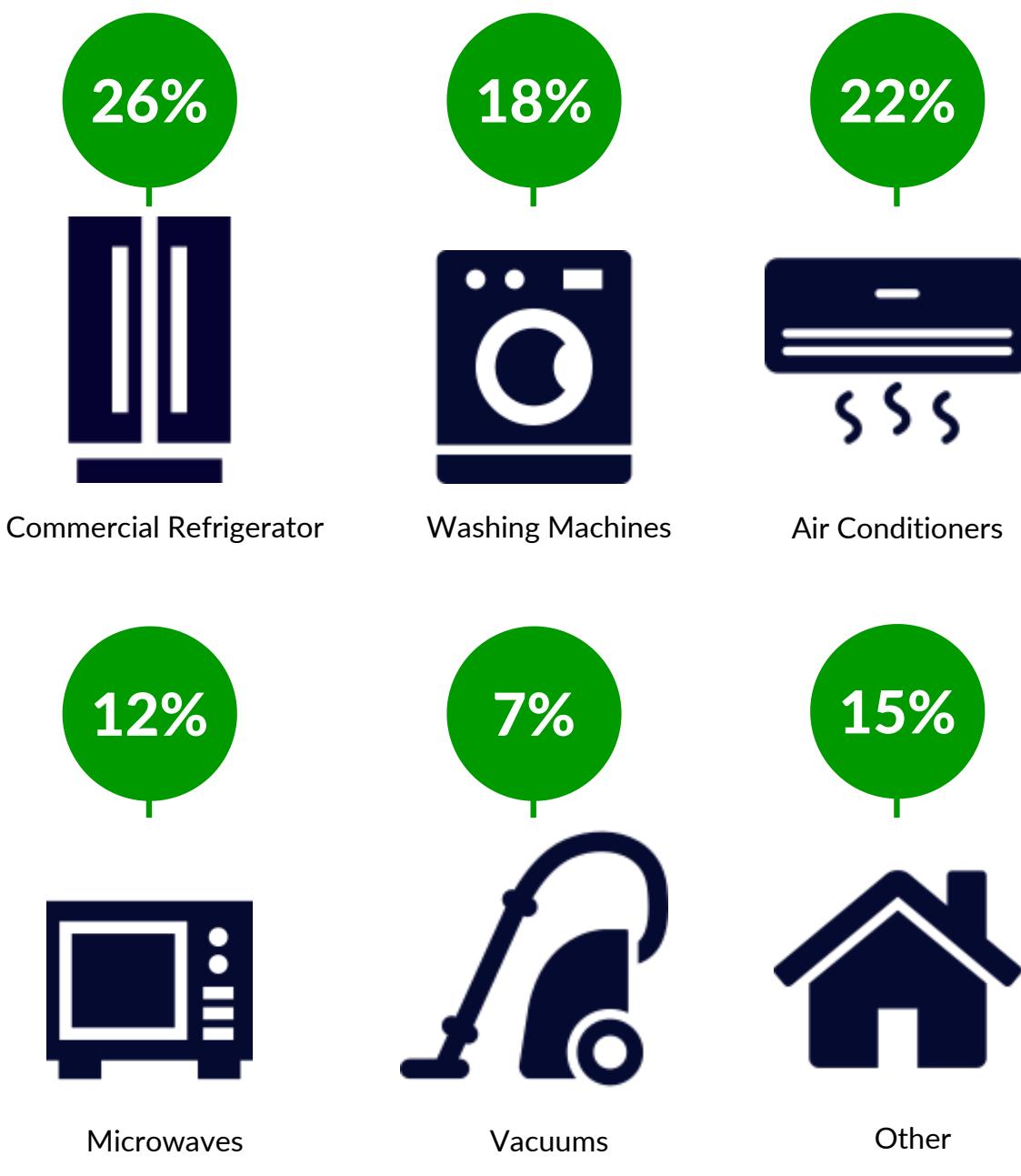


KEY FACTS

SALES

The primary products sold by GreenBell to businesses and consumers are as follows: Commercial Refrigerators, Washing Machines, Air Conditioners, Microwaves and Vacuums.

From a recent list of sales from the previous quarter, the following figure describes the sales of their home appliances:



KEY FACTS

WASTE PRODUCED

When producing the appliances listed above, various parts of each of them can be recycled, repurposed, or composted. From a 2015 study by the EPA, 20% of large appliances otherwise known as “durable goods” were recycled whereas only 6% of small appliances were recycled. At GreenBell, the subsections of waste materials as a result of production are listed below:

Aluminum - 197,600 tons per year

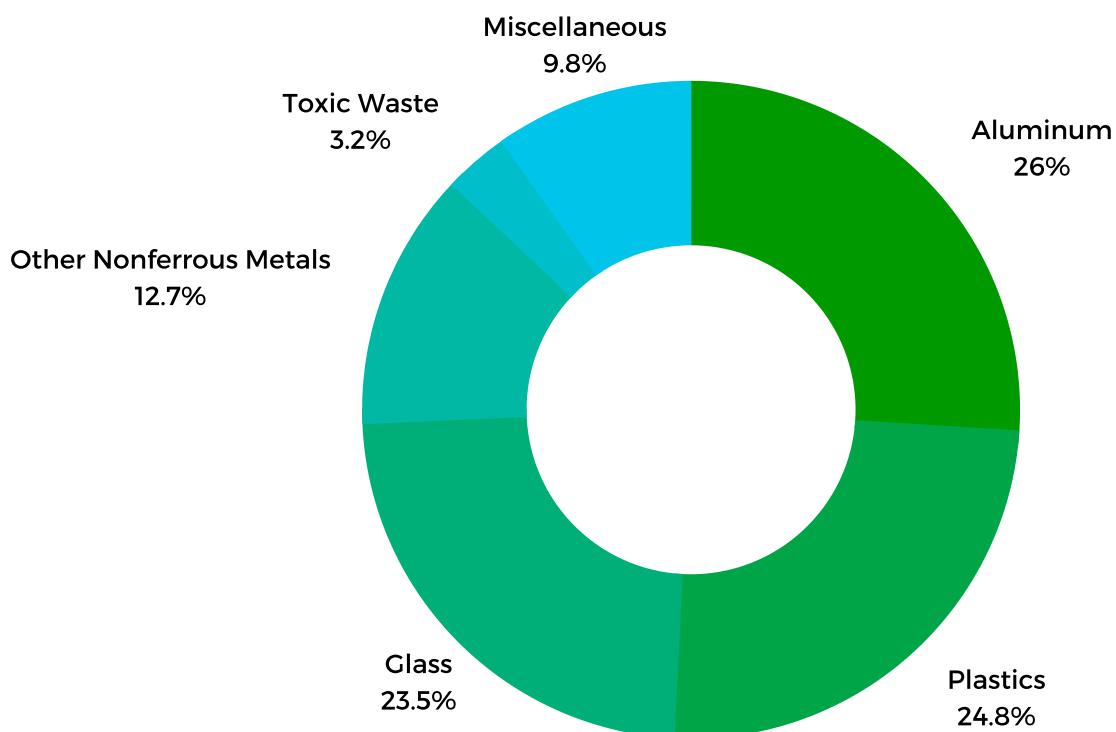
Plastics - 188,480 tons per year

Glass - 178,600 tons per year

Other nonferrous metals - 96,520 tons per year

Toxic Waste (Lead, Mercury, chlorofluorocarbons) - 24,320 tons per year

Miscellaneous (<1%) - 74,480 tons per year





PROBLEM STATEMENT

Over the past year, GreenBell has been facing issues in the manufacturing plant of their main campus leading to a rise in the number of defects in their products. This has led to a number of defective pieces being returned to GreenBell by unhappy customers. Although GreenBell has identified the manufacturing issue and remedied their plant accordingly, the unforeseen excess waste arising from these defects is causing unmanageable disposal issues – due to which the company needs to find new ways of capitalizing on these defective products and their individual parts and components. GreenBell expects an innovative and environmentally friendly strategy for making their e-waste, which is generated at the factory and is also a by-product of the parts returned, profitable in the long-term solution to be implemented. It is essential for the waste to be securely disposed of, thus, even when considering recycling of products, GreenBell believes it is imperative to look into variables such as contamination because of factors such as rust, corrosion, etc. As an influencer in its industry, GreenBell wants to lead by example. They feel passionate about environmental issues and believe themselves to be responsible for the disposal of electronic waste. Moreover, GreenBell is interested in pioneering a large-scale solution to the Grand Engineering Challenge of restoring and improving urban infrastructure through their e-waste turnover.

GREENBELL INC.

COMPANY FINANCIALS

Financial statements are important as they are reflective of a company's performance and financial position. Being a pioneer in appliance manufacturing, GreenBell has a considerable market share in the home appliance industry, however, the issue of defective products is affecting their overall turnover. The defective items have impacted the cost of goods sold and GreenBell's income – as a result of which their gross profits are increasing at a declining rate. Using GreenBell's financial statements to study the feasibility and affordability of any business plan before implementation could ensure long-term sustainable growth of the enterprise.

GreenBell's financial statements can be accessed on their website: eccpsu.com/GreenBell



OBJECTIVE 1

PROFITABLE WASTE

Explore innovative ideas to convert electronic waste into a revenue stream which also imbibes the company values of GreenBell. Determine the financial feasibility of your solution by considering the current costs of GreenBell.

Note: GreenBell's values can be accessed at eccpsu.com/GreenBell

OBJECTIVE 2

BUSINESS PLAN

Introduce a business plan and timeline for implementing your idea. The plan should include a pitch on how your solution is innovative, fits into the company's strategy and mission, and is financially viable. Consider aspects of what resources the company needs in order to execute the large-scale business model that you are suggesting. Think about the manpower required to execute the plan once your team ultimately recommends a strategic route for GreenBell to embark upon.

OBJECTIVE 3

PROTOTYPE

Design a viable prototype that ties along to your innovative solution. Creatively assess how you can demonstrate the practicality of your solution through your prototype. It does not have to be a scale functioning object or process, but can include aspects from rapid prototyping. You may consider building a prototype from the ground up or utilizing CAD software/other software readily accessible to you.

Note: Rapid prototyping can include elements of rough sketches/figures to illustrate a concept. The word rapid implies that an immediate fabrication of a model can take place through techniques such as using basic materials (paper, straws, clay, etc.) to build the model or illustrating a product/service intangibly through a skit, CAD models, UI/UX designs, simulations or other such means.

DELIVERY

You are the consultants of Engineering-Consulting Collaborative, a leading consulting firm in strategy and operations practices. Your team will be working for GreenBell Home Appliances to solve the outlined problems. Once your team's solution is prepared, you are expected to pitch your solution in a creative manner to the board of directors from GreenBell. They have encouraged you to utilize their website, available at eccpsu.com/GreenBell to learn more about their company and about some of the pressing issues they are facing. The board has asked you to deliver your solution in 10 minutes which will be followed by 5 minutes of Q&A. PowerPoint presentation is not mandatory, but if chosen as a mode of delivery then presentation should be no more than 10 mins of total presentation time.

EVALUATION CRITERIA

CONTENT

- Identifying and understanding GreenBell's issues and concerns.
- Addressing the objectives outlined.
- Recommending solution(s) in alignment with GreenBell's strategy & mission.
- Producing a prototype.
- Incorporating elements of design thinking in solution.
- Utilizing a variety of resources provided.

PRESENTATION & DELIVERY

- Caliber of delivery (tell your story!).
- Demonstration of teamwork.
- Creativity & innovation.
- Q&A (responses to questions).
- Presentation time: 10 mins.