

General Material Compactor

GE 5100: Product Development for Engineers

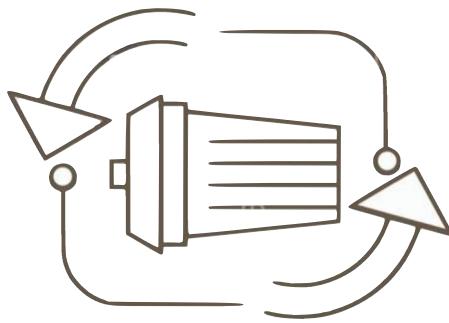
Fall 2020

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Timur Tsorayev
Vipul Suresh

Problem Statement

In towns and cities across the country there is an opportunity which looks at improving the waste management processes. The current process is quite labor intensive and inefficient. The most common waste disposal method by individual requires them carrying multiple bags of mixed waste for disposal leading to inconveniences and lack of waste segregation.

Waste Management



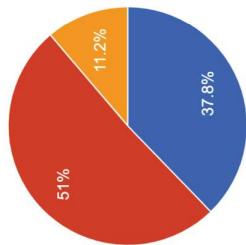
- Reports show that Americans generate between 250 and 400 million tons of garbage each year--all of which requires landfill space.
- The amount of waste generated has tripled since 1960.
- China's decision to no longer be the dumping ground for the world's recycled waste has left municipalities and waste companies from Australia to the U.S. scrambling for alternatives.

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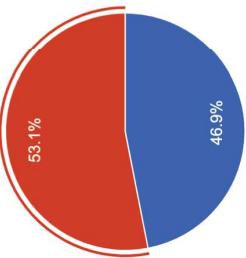
Concept Validation

- An average household of 3 person uses 8 trash bags weekly
- About 38% of respondents use scented bags
- Slightly less than half of respondents do recycling
- 9 out of 10 respondents complain that their trash has a foul smell

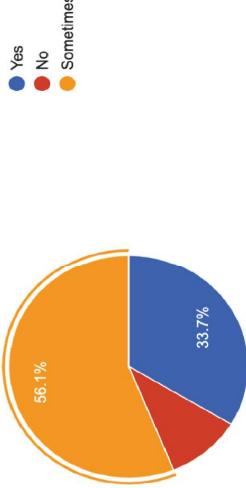
What kind of trashbags do you use?
98 responses



Do you have a separate trash for recyclables and non-recyclables?
98 responses



Does the trash have a foul smell?
98 responses

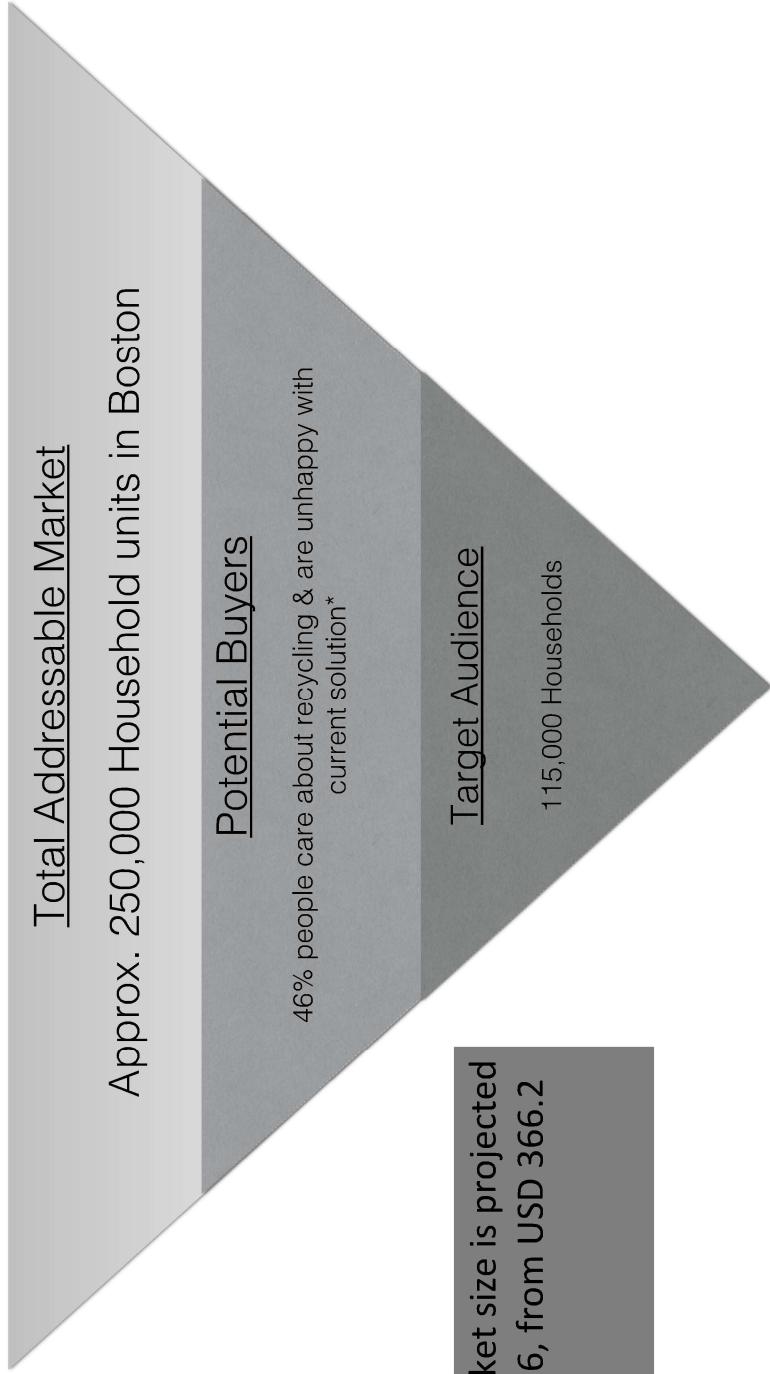


Market Segment



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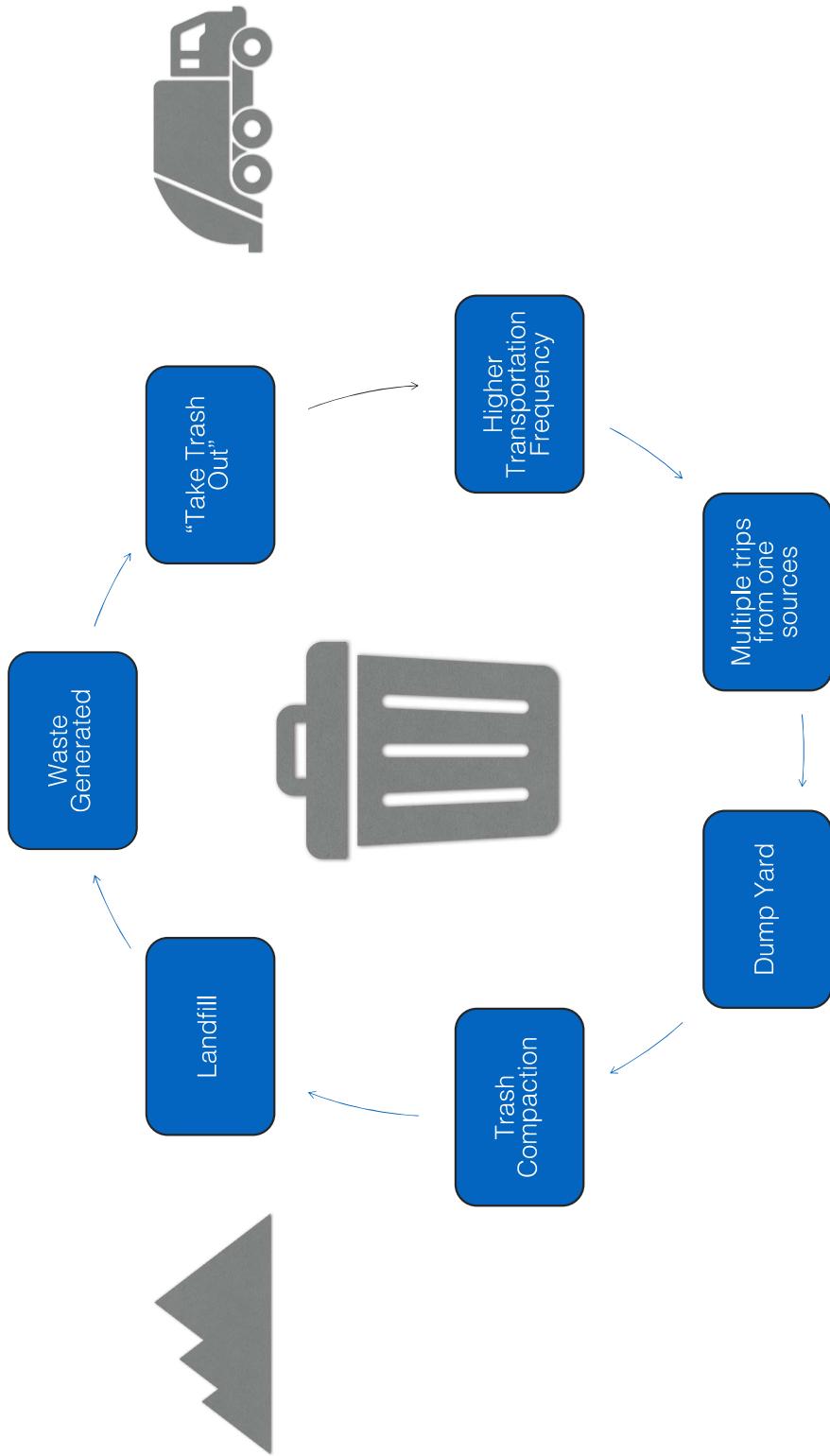
Market Opportunity



The global Trash Compactors market size is projected to reach USD 450.2 million by 2026, from USD 366.2 million in 2020, at a CAGR of 3.5% during 2021-2026.¹

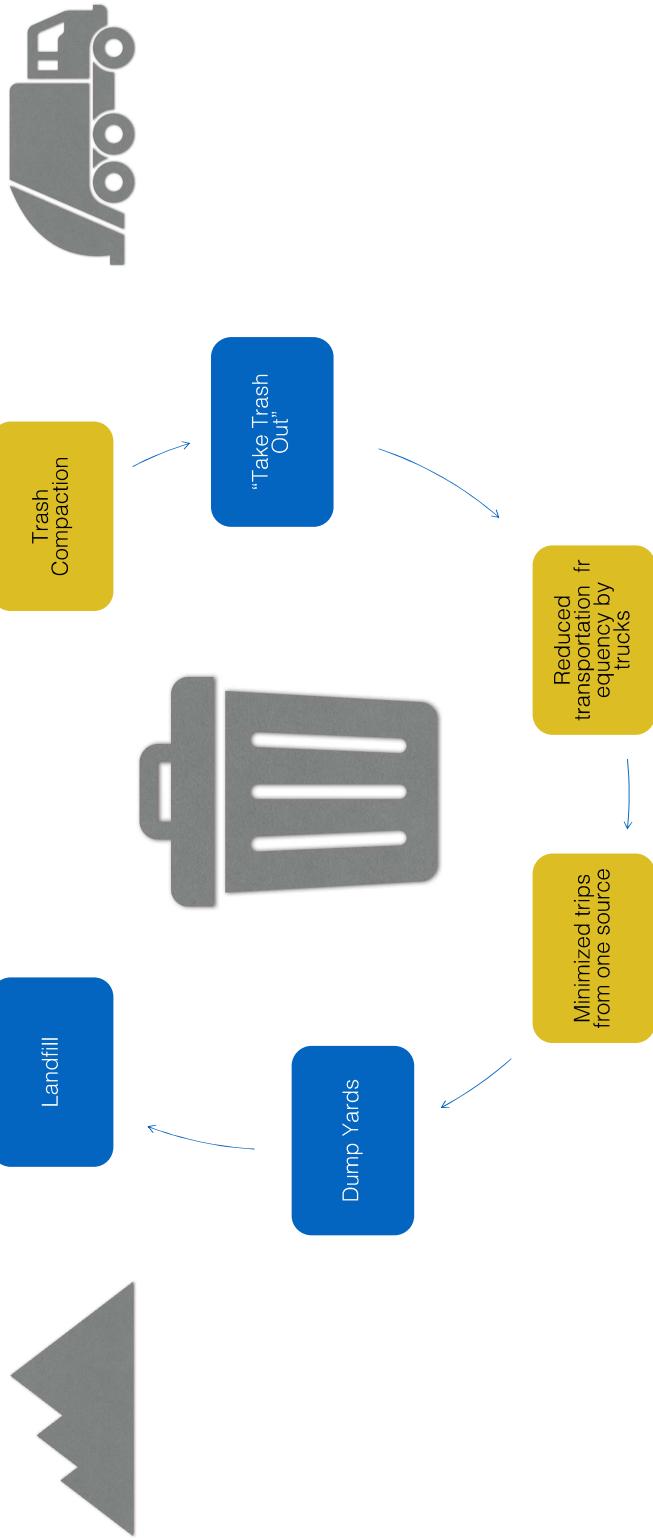
Based on survey conducted by us*

Current Waste Disposal Process



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Proposed Waste Disposal Process



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Competitive Analysis



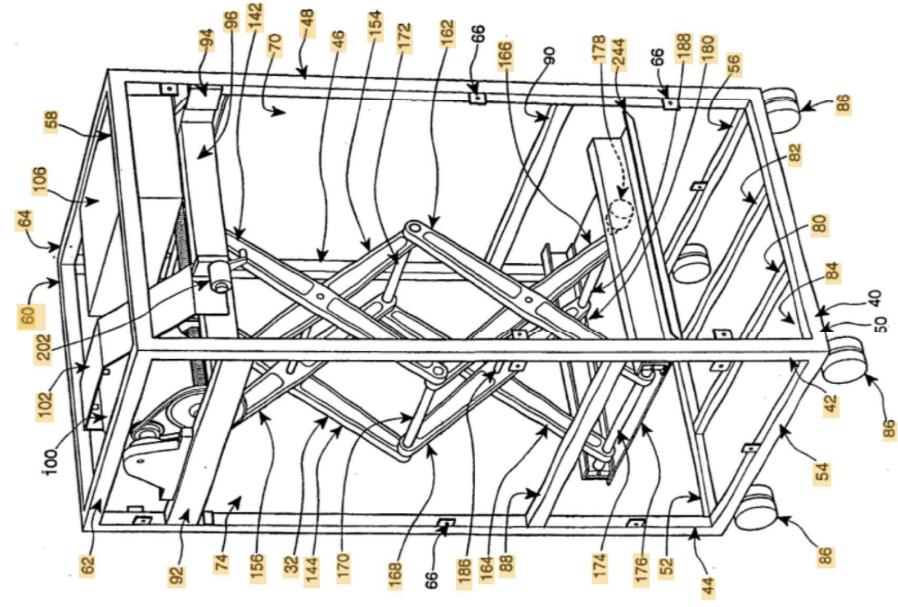
| Technology | Drawbacks |
|----------------------------|--|
| Smart garbage bin | Huge usage of plastic bags/covers |
| Scented disposable bags | Might have toxic chemicals |
| Clean your trash container | Unfriendly waste of water |
| Trash can fogger | Can trigger severe respiratory reactions |



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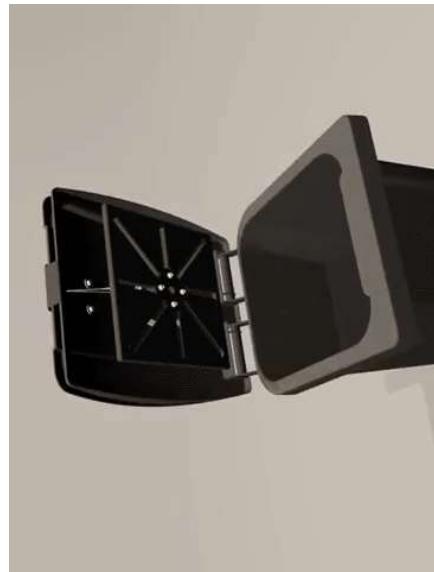
Trash Compactor





Trash Compactor Patents

- US3691944A
 - US20020056377A1
 - US20130319264A



3,720,844

SHEET 2 OF 6

PATENTED MARCH 13 1973

LEONARD J. SAHs
BY *Henry C. Gunn*

2
G
E

Value Proposition

1 ECO-FRIENDLY

Compostable Trash bags

Reduction in Bag Usage

Waste Segregation

2 CONVENIENT

Self Bag Change

Easy Waste Disposal

4 ODOR FREE WASTE

Recyclability Identifier

Auto Trash Compaction

3 SMART

Trash Pick up Reminders

Fragrant Capsules upon Compaction

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Business Canvas Model

| Key Partners | Key Activities | Value Propositions | Customer Relationships | Customer Segments |
|--|---|---|---|--|
| <ul style="list-style-type: none"> - Product Supplier - E-commerce platforms - Distribution Partners | <ul style="list-style-type: none"> - Product Design - Product Prototyping & Testing - Patent Applications - Assess Technological dependencies | <p><u>Eco-Friendly</u></p> <ul style="list-style-type: none"> - Recyclability Identifier & segregation - Smart Display including: Potential Carbon Footprint Reduction levels - Compostable Trash Bags | <ul style="list-style-type: none"> - Lucrative Servicing & warrant - Referral Program Cash back - 24x7 Product support | <ul style="list-style-type: none"> - Environment conscious house owners - People who generate copious amounts of waste - Small Restaurants Owner (Future) |
| Key Resources | Key Channels | | | |
| <ul style="list-style-type: none"> - Product Team - Manufacturing Team - Marketing Team | <p><u>Convenience</u></p> <ul style="list-style-type: none"> - Trash Pick-up Reminders - Auto Waste Compaction - Self Bag Change <p><u>Long-term Money Saver</u></p> <ul style="list-style-type: none"> - QVC - House Management Associations <p><u>Fragrant Odor Capsules</u></p> | | | |
| Cost Structure | Revenue Streams | | | |
| <ul style="list-style-type: none"> - Product Advertising & Marketing - Manufacturing Cost - Employees Salary - Eco-friendly packaging Cost - Eco-friendly grants offsetting production cost | <ul style="list-style-type: none"> - Direct Product Sales - Revenue from monthly servicing contracts | | | |

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| | | <p>Channel</p> <ul style="list-style-type: none">- Trash Pick-up Reminders- Waste Compaction- Bag Change | <ul style="list-style-type: none">- Amazon- Target- Walmart- QVC- House Management Associations |
| | | <p>Revenue Streams</p> <ul style="list-style-type: none">- Direct Product Sales- Revenue from monthly servicing contracts | |
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| | Channels | | - Amazon - Target - Walmart - QVC - House Management Associations | |
| | | | | Retail |
| | | | | - Direct Product Sales - Revenue from monthly servicing contracts |
| | | | Cost Structure | |
| | | | - Product Advertising & Marketing - Manufacturing Cost - Employees Salary - Eco-friendly packaging Cost - Eco-friendly grants offsetting production cost | |

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| | Oodor Control | | | |

Cost Structure

- Product Advertising & Marketing
- Manufacturing Cost
- Employees Salary
- Eco-friendly packaging Cost
- Eco-friendly grants offsetting production cost

GE 5100: General Material Compactor

Business Stakeholder



Market Specifications

| User Requirements | Definition | Rationale | Performance Expectation | Source |
|--|--|--|---|--------|
| Reduced number of bags | Ability to use less amount of plastic bags just to handle waste | Spending more on plastic bags at the rate of ~40 cents a bag is a problem to the increased carbon footprint | Target: At least 50% to 75% reduction in the number of bags used between cycles | Survey |
| Reduction in frequency of household waste removal | Ability to reduce the number of times one needs to spend time and energy to take dispose trash | Wasting resources around waste is a waste | Help reduce this frequency by at least 50% | Survey |
| Segregation of Recyclable materials | Ability to provide separation between materials which can be recycled*** | Segregation allows for two different ways to handle disposable materials | Store and handle with minimal contamination between the two | Survey |
| Odor suppression | Ability to store waste in the bin without producing foul odor. | The waste that's being stored for extended period may produce foul smell which may cause the household member an unpleasant experience and attract bugs. | Regardless of the type of waste the user | Survey |
| Smart Functionality | Ability to identify the amount of waste present in the unit and actuate the device when required, automatically change bags, remind when the device is full and various other alerts | Attention is diverted to the process of compaction and disposal, but this feature enables users to not worry about when to interact with the device | Minimal to none False Positive activations and alerts | Survey |

Market Specifications

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|------------------------|--|---|---|
| of business waste | Businesses and companies are looking for ways to reduce their waste output. | Business and handle with minimum cost. | Business |
| of residential waste | Residential waste is a major concern for many companies which can be reduced by recycling. | Recycling of the type of wastes they create. | Business |
| Other categories | Businesses are looking for ways to reduce their waste output. | Businesses are looking for ways to reduce their waste output. | Business |
| Business | Businesses are looking for ways to reduce their waste output. | Businesses are looking for ways to reduce their waste output. | Business |

Market Specifications

| Customer requirements | Market needs | Market opportunities | Market constraints |
|------------------------------|--|---|--|
| Reduced transportation cost | Reducing the cost of shipping | Reducing the cost of shipping | Reducing the cost of shipping |
| Reduced time of delivery | Reducing the time it takes to deliver | Reducing the time it takes to deliver | Reducing the time it takes to deliver |
| Reduced number of trips | Reducing the number of trips | Reducing the number of trips | Reducing the number of trips |
| Reduced frequency of removal | Ability to reduce the number of times one needs to spend time and energy to take dispose trash | Wasting resources around waste is a waste | Help reduce this frequency by at least 50% |

Market Specifications

| Customer Requirement | Market Specification | Supplier Specification | Comments |
|--|---|---|--|
| Market requirement of being able to handle all types of recyclable materials | Ability to handle all types of recyclable materials | Ability to handle all types of recyclable materials | |
| Market requirement of being able to segregate materials | Ability to segregate materials | Ability to segregate materials | |
| Market requirement of being able to store and handle materials separately | Ability to store and handle materials separately | Ability to store and handle materials separately | |
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Market Specifications

Market Specifications

| User Requirement | Market Specification | Business Rule | Design Specification | Implementation |
|---|---|-----------------|---|---|
| Market Specification of Waste Type | Ability to identify the amount of waste present in the unit and actuate the device when required. | Waste Type | Ability to identify the amount of waste present in the unit and actuate the device when required. | Ability to identify the amount of waste present in the unit and actuate the device when required. |
| Market Specification of Waste Disposal | Ability to identify the amount of waste present in the unit and actuate the device when required. | Waste Disposal | Ability to identify the amount of waste present in the unit and actuate the device when required. | Ability to identify the amount of waste present in the unit and actuate the device when required. |
| Market Specification of Waste Removal | Ability to identify the amount of waste present in the unit and actuate the device when required. | Waste Removal | Ability to identify the amount of waste present in the unit and actuate the device when required. | Ability to identify the amount of waste present in the unit and actuate the device when required. |
| Market Specification of Waste Recycling | Ability to identify the amount of waste present in the unit and actuate the device when required. | Waste Recycling | Ability to identify the amount of waste present in the unit and actuate the device when required. | Ability to identify the amount of waste present in the unit and actuate the device when required. |
| Market Specification of Other Functions | Ability to identify the amount of waste present in the unit and actuate the device when required. | Other Functions | Ability to identify the amount of waste present in the unit and actuate the device when required. | Ability to identify the amount of waste present in the unit and actuate the device when required. |

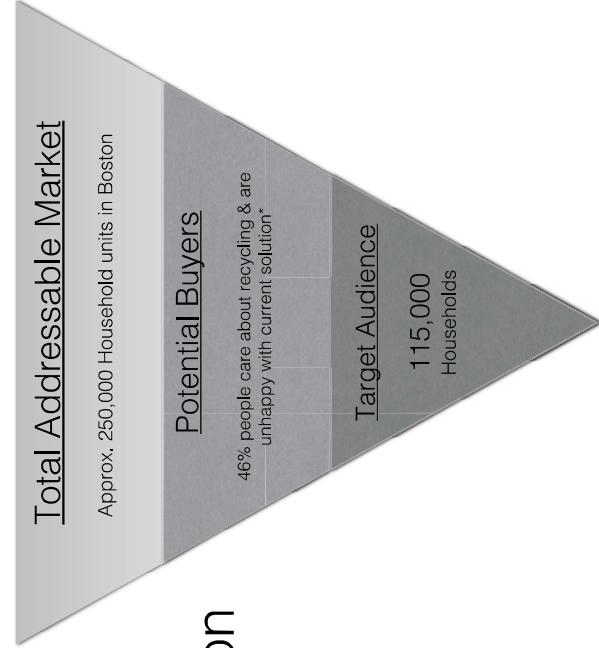
Smart Functionality

| | | |
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|--|---|---|

Cost Structure*

Processes involved: Design Development, Patenting, Prototyping, Initial Manufacturing overheads, Marketing costs, Logistics etc.,

Targeted Selling Price of the Product: ~ \$400
Cost to produce each product: ~ \$100



Our Potential Market: ~34,500 Households in Boston

Overhead Cost: ~ \$ 3,450,000

Questions?

References

- Trash Compactors Market Size 2020 by Global Growth, Share, Regions, Demand Status, Latest Trends, Insights and Forecast to 2026." Home - FOX 40 WICZ TV - News, Sports, Weather, Contests & More, 25 Aug. 2020, www.wicz.com/story/42541794/trash-compactors-marketsize-2020-by-global-growth-share-regions-demand-status-latest-trends-insights-and-forecast-to-2026.

Appendix

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Business Stakeholder Matrix

| | Stakeholder Name | Contact Information | Impact to Project | Influence to Project | What's Important to Stakeholder | How Stakeholder Can Contribute | How Could Stakeholder Derail Project | Strategy to Engage |
|---|-------------------|---|-------------------|--|--|--|---|---|
| 1 | Posmi D. Ball | MSN Inc. (Material Supplier) (141) 592 XXX | H | Provides materials needed to manufacture | Stable and Long-term demand orders | Providing cost effective options for raw materials | Delays in raw material supply | Weekly update |
| 2 | Howdy Steve | Product Manager (718)-281-XXX | H | Engineering the product from design to prototyping | Fulfilling user needs in accordance to the marketing and engineering specs | Conducting User Research & Market Analysis | Delays in conceiving a Minimum Viable Product | Daily design reviews |
| 3 | DJ Khalid | Manufacturing Manager Notherwon OEM (626)-060-XXX | H | Prioritizing user requirements to implement | Building a user centric product. | Translate user requirements into technical specification | Providing a complex product design | Daily Huddles |
| 4 | Date Mike | Distributing Contractor (380)-651-XXX | H | Scaling prototypes to Market ready products | Manufacturing with least defect rate | Adapting scalable automation processes | High defect rate and overutilization of resources | Daily Manufacturing line supervision |
| 5 | Justin Lumberpond | Junior Partner Mad Men Ad Agency (602)-176-XXX | M to H | Distribution of products to end markets | Sufficient inventory Manufacturing | Resource Planning and estimating the future demand | Disrupting the Supply chain by irregular planning | Weekly POC meetings |
| 6 | Consumer | product safety commission | M to H | Regulatory | Stronghold over the market segments | Driving efficient Supply Chain strategy | Preferential Bias over Competitor's Product | Weekly Update meetings |
| | | | | | Innovative Marketing approaches | Inability to reach new customers | Tarnish the products image | Preliminary & Critical Design Report approval |
| | | | | | Provide critical user requirements | Provide standards | Not approve the product safe for market | |

Functional Market Specification

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