Refuse the Refuse
Decreasing Food Waste Deposited into Landfills

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Public Health, Aerospace Engineering, Biotechnology, Accounting, Hospitality Management, Fashion Design

Abstract
As the global economy grows, landfills also continue to grow, accumulating mass, traveling and expanding to more land. This is a dilemma as many resources are finite, and space is limited. Accrued waste also has the negative effect of releasing harmful greenhouse gases and increasing global warming. Paper, food, yard trimmings, wood, textiles, plastics, metals, and glass make up most of the refuse, all valuable materials that, once in a landfill, have no further purpose. In 2014, food alone made up 14.9% of generated waste in the United States and one third of food produced for human consumption is wasted each year. Companies, institutions, and people may someday aim for perfect source reduction, reducing the surplus generated in the first place. Yet, in the current model, biodegradable food waste gets stuck in a landfill, instead of going back into a closed loop system. Currently, some attempts are being made to combat food waste with donations, and waste to energy initiatives. However, with 70% of world food waste still ending up in landfills, the current models are not working. To combat this section of solid waste, a waste to energy initiative is proposed. Starting in Kent, OH the company offers a collection service which brings food refuse to our biofuel/compost facility. Backed up by the environmental and financial evidence, we effectively participate in waste reduction and offer a blueprint for future global implementation of our system.

The Problem & Objectives
Food waste dumped in landfills results in production of dangerous gases like carbon dioxide and methane. Estimated value of food wasted in 2016 in the United States was $218 billion. According to the Food Waste Reduction Alliance, some of the major barriers in reducing food waste include liability concerns in donated food, transportation constraints, and an insufficient number of recycling options.

- Minimize food waste deposited into landfills.
- Contribute towards the reduction of greenhouse gases.
- Increase environmental awareness and participation in food waste disposal.
- Create a blueprint that can be replicated/adapted on a global scale.

Conversion to renewable energy – Anaerobic digesters use bacteria to convert food waste into methane biogas used to generate electricity. The electricity generated can be sold to local city councils at a cheaper rate. An example is the EPA’s Pacific Southwest Media Center which currently produces 1.6 megawatts per year.

Composting – Food waste can be composted and used as a natural fertilizer. This will be sold to local farmers.

Uses of Collected Food Waste

Food Waste Processing

Food waste at a catering business
Photography by Michael Mandac

Estimated Value of Food Produced vs Wasted in One Year (In Billions)

<table>
<thead>
<tr>
<th>Product</th>
<th>Value Produced</th>
<th>Value Lost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals and Bakery Products</td>
<td>$1,661</td>
<td>$714</td>
</tr>
<tr>
<td>Meats, Poultry, Fish, and Eggs</td>
<td>$329</td>
<td>$82</td>
</tr>
<tr>
<td>Dairy Products</td>
<td>$162</td>
<td>$32</td>
</tr>
<tr>
<td>Fruits and Vegetables</td>
<td>$104</td>
<td>$17</td>
</tr>
<tr>
<td>Total</td>
<td>$2,297</td>
<td>$1164</td>
</tr>
</tbody>
</table>

Proposed Model of Operations

A business that seeks to champion sustainable solutions on food waste disposal resulting in composting and creating biofuels is proposed. The organization will create central collection centers for food waste, initially targeting restaurants within a 30 mile radius with the goal of reaching to all eleven segments of food waste identified by the National Resources Defense Council. Refuse the Refuse will provide each entity with food collection bins and these will be picked up on a weekly basis. Collected waste will be brought to the facility and converted to biofuels and compost. Energy will be harnessed, compost will be collected, and each will be distributed for sale to different markets. Electricity generated from food waste from 60 restaurants will power 100 households per year.

Kilowatt Hour of Electricity can be Produced vs. Different Types of Compost

Implications
By collecting food waste in Kent, Ohio we will be...
- Reducing waste deposited into landfills
- Generating both electricity and natural fertilizers
- Creating local jobs
- Acting as a blueprint for similar environments
- Acting as a roadmap for different environments
- Improving public health and environmental quality

Future Plans

Short Term Goals
- Work with LaunchNET
- Register our business name
- Raise awareness about the impact of food waste
- Participate in Kent’s Idea Olympics to raise awareness and seed money
- Start crowdfunding campaigns such as Kickstarter
- Apply for grants
- Engaging with city council, the Kent community and local restaurants
- Creating relationships with manufacturers and companies
- Raise $650,000 to start our business

Long Term Goals
- Expand to all 11 food waste sectors
- Increase the number of locations nationally
- Increase to other organic matter such as yard trimmings
- Adapting our plan to fit different economies

References