El Cercado Plastic Bottle Recycling Program

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Overview

-El Cercado is littered with plastic

-No established recycling program

-Plastic bottles are incinerated

-This is wasteful, toxic, and not aesthetically pleasing

-To be successful, the solution to this problem must be economically and culturally acceptable

Potential Users of the Plastic Resin Pellets

-Plastic furniture

-Clothing fabric

-Upholstery and carpeting

-Recycling bins

Potential Users of System

-All citizens of El Cercado

Associated costs of a conventional recycling program

-Collection vehicle(s):

-Employees:

-Drivers

-laborers

-plant operators

-administrators

-Fuel

-Plant equipment

-Cans

-Electricity

Associated costs of a conventional recycling program

Fixed cost analysis:

Assumptions:

1 vehicle -- $125,000

Plant equipment: $20,000 includes conveyor belt and pelletizer

Collection cans: $20/can * 5000 cans = $100,000

= $245,000

Associated costs of a conventional recycling program

Variable cost analysis (monthly):

Assumptions:

5 Employees: $100/month salary * 5 employees = $500

Fuel: 1,000 liters @ 40 Dominican pesos/liter = $40,000/month

Electricity: $500/month

= $41,000/month

Design concept

Our process is for El Cercados residents to deliver their plastic bottles to a centralized collection point in the city. The bottles will be weighed, pelletized, and packed for shipment to the closest port for sale on the open plastic resin market. Residents will be immediately compensated. The operation will sell the pellets on the open market and net profits will be returned to the town to fund and educational initiative.

Plastic Resin trading (North American April 2017 spot prices)

LDPE: $.62/lb

HDPE: $.57/lb

PP: $.50/lb

Our Solution...

Pelletize and sell the plastic on the open market

to market

Design features

- Simple
- Does not require advanced education or training
- Low startup costs
- Immediate income for all participating residents
- Minimal carbon footprint
- Photovoltaic (PV) cells will provide pelletizer energy (electricity)
- Community involvement and awareness for future generations to keep their city clean
- Profits go towards educational programs for the children
- The goal of removing plastic bottle waste can be achieved even if all residents do not participate. (Other residents are incentivized to collect the plastic for them)

Green Engineering Design Considerations

#1 -- Inherent vice circumstantial

The only processing involved in this process is pelletizing the plastic. No hazardous chemicals are used.

#2 -- Prevention instead of treatment

This process reduces waste.

#4 -- Maximize mass, energy, space, and time efficiency

Small infrastructure that does not rely on fossil fuels

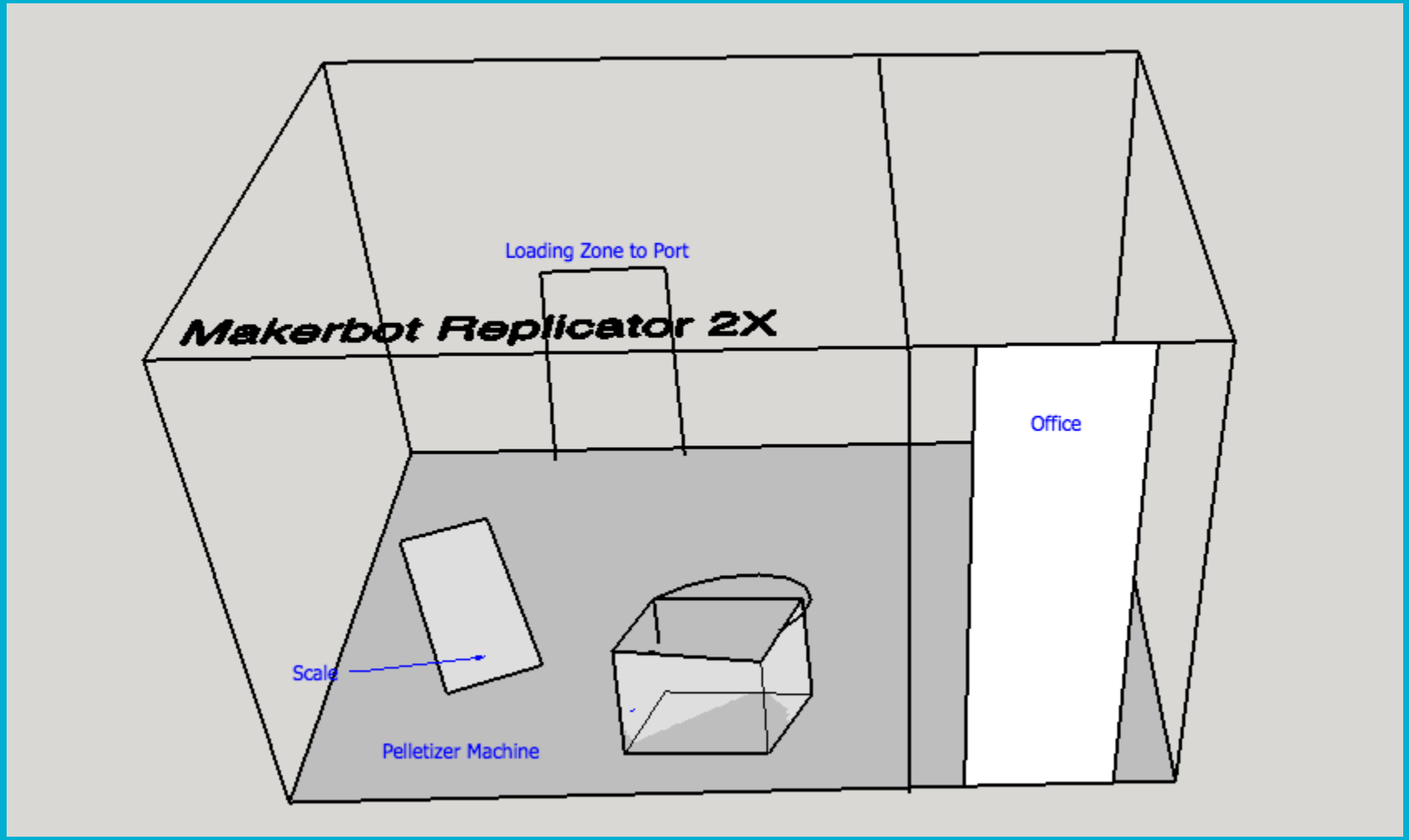
#12 -- Renewable rather than depleting

Photovoltaic cells will provide the pelletizer's electricity

Potential Environmental, Economical, and social impacts

- Less waste for landfills/around town
- Revenue for community to redistribute
- Jobs
- Members of the community can build friendships as they pick certain days to recycle together
- More children will be educated starting at an early age and in turn help reduce the poverty level
- Motivation to other cities to participate in the process or start a program closer to them

Sketch of final product



Product Cost Analysis

Projected Revenues

Assumptions:

-25,000 residents

-2 bottles/person day

-13 grams per bottle

-$.50 per pound sale price

= $715/day or $21,495/month

Product Cost Analysis

Fixed costs

- 1 Pelletizer ($8,000)
- 2-lb spring scale ($5)
- PV panels ($12,000)

Recurring costs

- Packaging bags ($.03)
- Building rent ($500)
- Employees ($300)
- Contracted trucking ($.3/lb)
- Redemption fees ($.03/lb)

Product Cost Analysis

Monthly profit/loss

Revenue/month ($)
$ 21,495.05

Expenses/month ($)
Office rent
$ 500.00
Salaries
$ 300.00
Packaging
$ 171.96
Shipping
$ 12,897.03
Redemption
$ 1,289.70
Loan
$ 608.44

Net profit/month ($)
$ 5,727.91

Shipping volume calculations

Projected Revenues

Assumptions:

-50 cubic yard shipping container

-32 pounds per cubic yard (uncompacted)

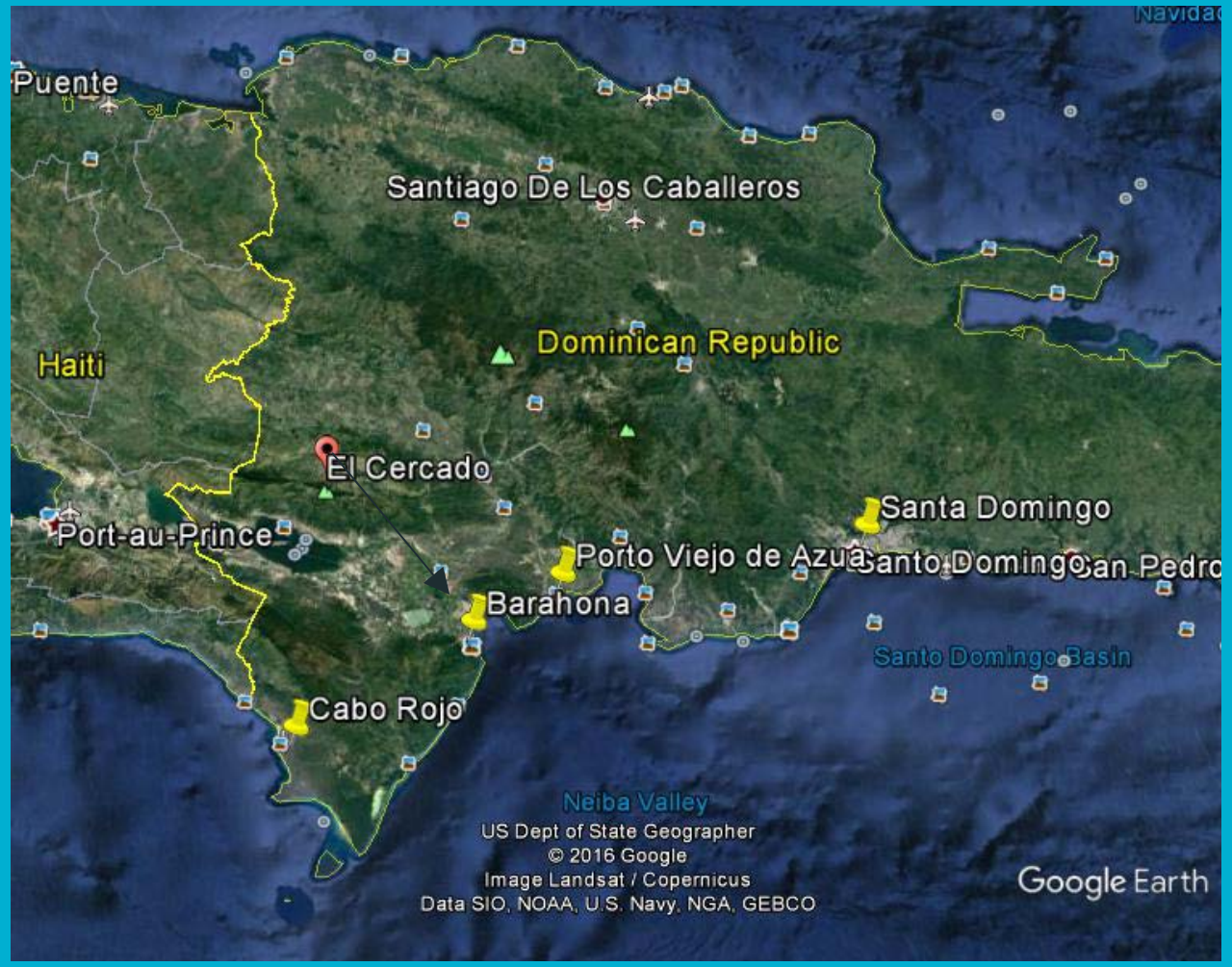
-150 pounds per cubic yard (compacted)

-13 grams per bottle

-150 lbs per cubic yard

=7,500 lbs per 20’ container shipment or 1 shipment/5.23 days

Closest Ports For Shipping To North American Markets



Excess Profits for Community Projects

The Dominican Republic Early Childhood Education Program: Identified as a program to help reduce poverty. Access to pre-primary education and focused on poor children who had greater unmet needs of schooling.

Results: The project improved the quality of education through construction of classrooms, addition of more teachers, and formation of parent committee.

Donation Impacts: Students will be able to obtain a variety of textbooks for different subjects, fieldtrip opportunities, older students can travel to participate in internships.

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