Background

Cooperative Energy, Recycling & Organics, or Cooperativa para Energía, Reciclaje, y Orgánicos (CERO) is a multicultural, worker-owned cooperative looking to site an Anaerobic Digestion (AD) facility that will generate dignified green jobs in Boston’s low-income communities of color.

Anaerobic Digestion is a biological system in which organic material, food & yard waste, or industrial waste is broken down by microorganisms in an oxygen starved environment. The end result is a range of compost products, which is used to generate heat or electricity, as well as a soil amendment.

This research took a broader, comprehensive approach to understanding AD siting criteria, both in the context of CERO’s goals and in locating this facility in an urban setting. The GIS filtration essentially applied criteria, both in the context of CERO’s goals and in locating this facility in an urban setting.

The Table of Criteria below displays the criteria that were developed, the various metrics used, and at which step in the process they were applied.

Methods

The methods used to apply the criteria took the form of a three step process depicted in Figure 1 above.

The GIS filtration essentially applied criteria in the context of eliminating parcels that did not meet certain metrics. The scenario analyses and ortho-imagery evaluation organized the site selection, applied criteria in a more exploratory manner, and then selected sites within each scenario for their AD suitability. The ground truthing step was both a validation effort, with the purpose of confirming the results generated and observed in the previous steps, as well as an opportunity to further assess selected parcels for their suitability.

The Table of Criteria below displays the criteria that were developed, the various metrics used, and at which step in the process they were applied.

<table>
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<th>Criteria</th>
<th>Description</th>
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<td>Waste Proximity Scenario</td>
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<td>Fairmount Corridor Scenario</td>
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<td>Eco-Energy Park (EEP) Scenario</td>
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Results

The initial GIS filtration step resulted in a selection of 115 parcels by eliminating parcels that are not in the study area, in an industrial zone, without 1/2 acre of undeveloped land that is not in a flood zone, compatible w/ commercial trucks; within 1/4 mile of an MBTA bus stop; and at least 250 ft. from a public drinking water well.

While this filtration created a reasonable universe of parcels to consider, it was too large a number to analyze further. The three separate scenario evaluations reduced these 115 parcels to a much more manageable selection of 27 parcels.

Waste - Here 13 parcels from Step 1 were selected based on their proximity to the greatest density of waste, concentrated in the northern portion of our study area.

Fairmount - In this scenario, only parcels that were located within 1/2 Euclidean distance of the proposed stops along the Fairmount line were considered. The 18 parcels that resulted from this scenario were spread across our study in the neighborhoods of Roxbury, Dorchester, and Hyde Park.

EEP - This scenario yielded the most parcels with 19 remaining from the initial Step 1 results. Parcels were selected based on their undeveloped acreage as a proxy for future expansion potential.

The ground truth results ran the spectrum from parcels being deemed unsuitable, to confirming a parcel as possible, to determining a parcel to have high potential. We visited 16 parcels of the 27 that suited one or more of the scenario analyses. Parcels were selected from each scenario to illustrate a broad spectrum of possibilities along the range of criteria.

Two of the high potential sites are depicted in Figures 2 and 4 above with an artist rendering of what an AD facility would look like at each site; photos of the actual sites are included in Figures 3 and 5 respectively. The top 4 high potential sites have their waste shed analyzed to the right.

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It is important to note that this assessment does not intend to identify the most suitable site for an AD facility for CERO; rather it aims to develop and demonstrate the process applied to siting an urban AD facility.

Waste Shed Analysis: 4 High Potential Sites

Parcels #1, #4, #6, and #16 East Cottage Street

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The maps below depict the AD site suitability analysis for the parcels associated with them.