



Costs and Approaches for Municipal Solid Waste Recycling Programs: *Academic Perspective*

Morton Barlaz
Distinguished University Professor Emeritus
North Carolina State University
April 16, 2024

Outline

- The objective should be broader than increased recycling
- The data required for proper assessments are old
- Participation is a problem
- The labeling system for plastics is not useful
- Are we considering actions that only work at scale of the U.S. vs individual states/municipalities

What is EPA's Goal?

1. Increase recycling
 2. Decrease emissions
 3. Maximize energy
- Increasing recycling does not guarantee 2 and 3
 - Recycling vs. conversion technologies vs thermal treatment
 - I would like to see a focus on goals 2 and 3
 - There may be times when landfill disposal is best for the environment

Life-Cycle Analysis (LCA) is needed to assess technical and policy alternatives

- Understand the benefits (reduced greenhouse gases) and perhaps tradeoffs (increased emissions of another pollutant)

Conduct sensitivity analyses to make sure that conclusions are robust or be prepared to say that 2 or 3 alternatives are all good

Consider the impact of shifts in the energy grid given the useful life of solid waste infrastructure

LCA data are old and I suspect outdated

- WARM

AI – data in Warm appear to be 20 years old

Plastics – from 2018

Paper – Franklin data from 1998

Unclear that Ecoinvent is any better

Global weighted averages are needed

Here too, manufacturing shifts with time so we need sensitivity analyses

Not all recycling is closed loop but make sure that something is avoided

Confirm recycling is beneficial even if hard to quantify

Waste Composition and Participation

Participation is poor – Al cans at 50%

Residential OCC is more significant than 20 years ago as a result of increase in home delivery

Look for low hanging fruit – large quantities of one material in commercial and institutional waste

Bottle bills work and smaller stores accommodate returns in Europe

The numbering system for plastics is not effective

Consider Scale

Recycling policy is largely implemented at the state and local level

Is EPA going to assume leadership?

Do they have the legislative authority?

Some conversion technologies require quantities that require large regions to coordinate

Some require what might be a petrochemical plant

Acknowledgements

- Dr. Jim Levis at Sphera