TRANSFORMING THE NON-RECYCLED PLASTICS (NRP) OF NEW YORK CITY TO SYNTHETIC OIL

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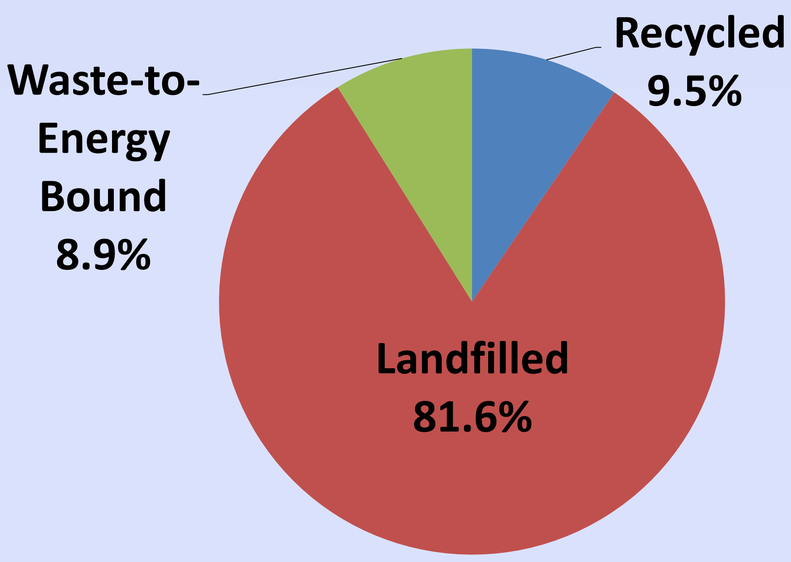
OBJECTIVE

To quantify, analyze, and compare the environmental and economic impacts of landfill disposal to alternative thermal treatment pyrolysis processes for New York City's non-recycled plastic waste (NRP). This study specifically looked at pyrolysis processes developed by the following companies: JBI Inc., Agilyx Inc., and Climax Global Energy Inc. All of these processes convert NRP waste into synthetic oil and other petrochemical products for industrial use.

PART I: Quantifying and Characterizing NYC Plastic Waste

NYC Generation Tonnages (2010):

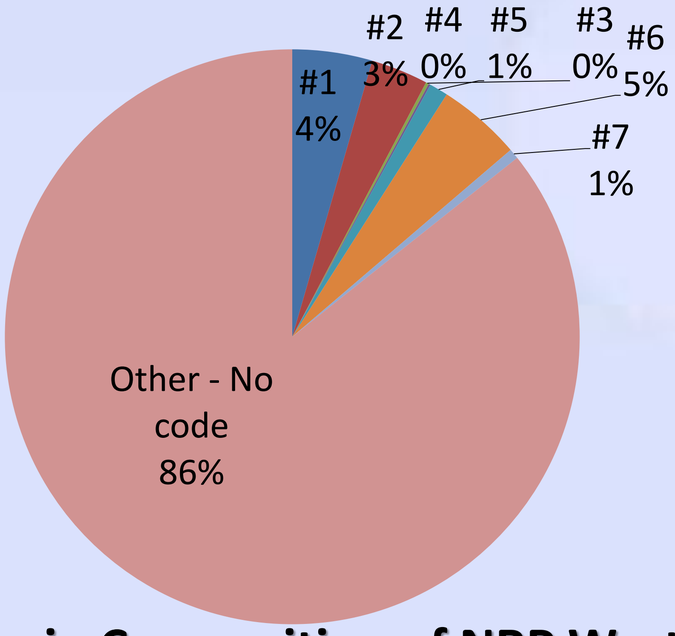
- Net MSW: 7.45 million short ton
- **Plastic waste: 750,000 tons**



Fate of NYC Plastic Waste

- NRP refers to plastic waste that is landfilled
- **NRP generation in NYC (2010): ≈ 611,000 tons**
- Pyrolysis processes would divert NRP waste from landfills

Resin	Product Type
#1-PET	Bottles, Tubs/trays
#2-HDPE	Bottles, Tubs/trays
#3-PVC	Bottles, Tubs/ trays
#4-LDPE	Bottles, Tubs/trays
#5-PP	Bottles, Tubs/trays
#6-PS	Rigid and expanded containers/ packaging
#7-Other	Bottles, Tubs/trays
Other- no code	Films, single-use plastic, other rigid container

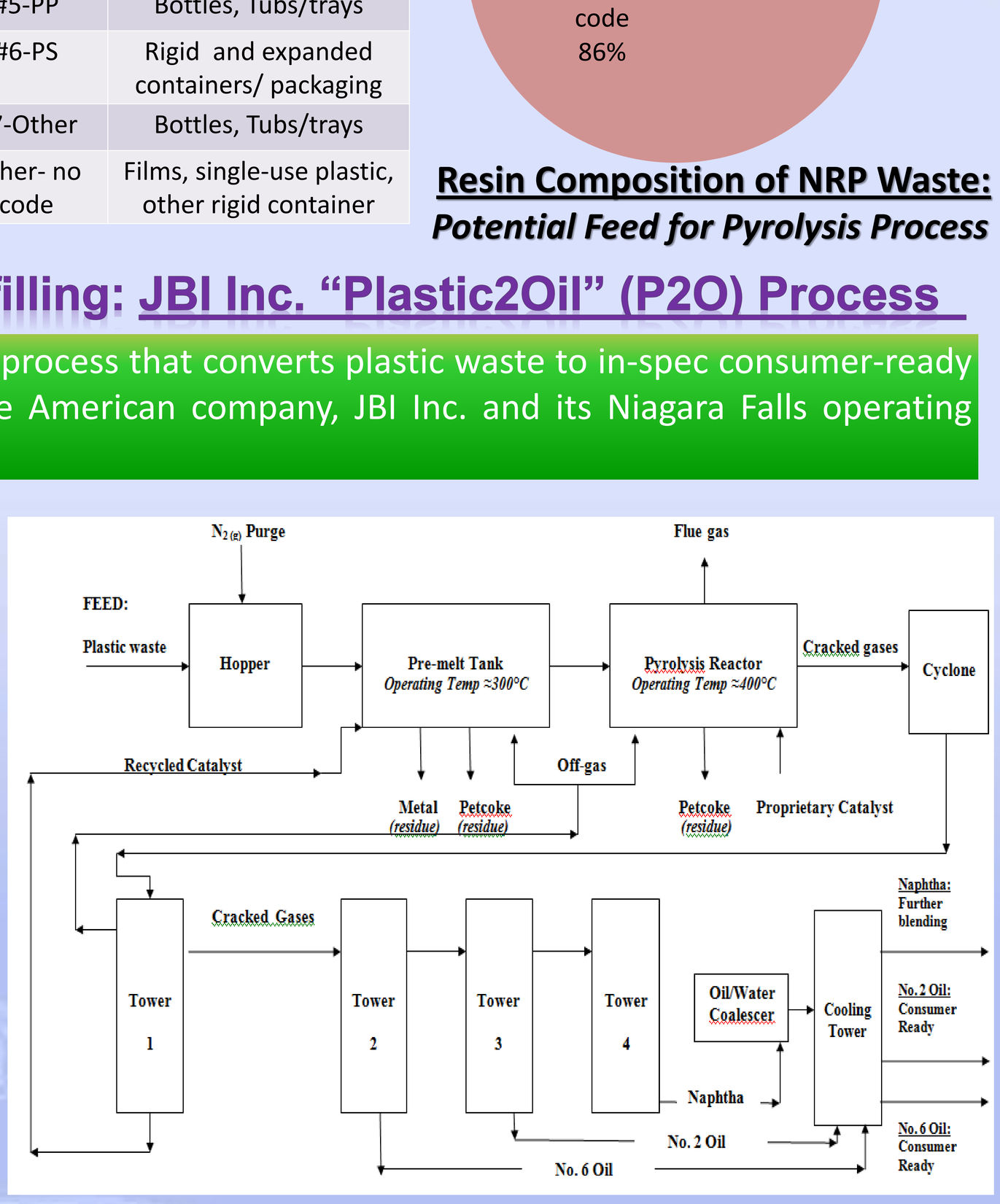


Resin Composition of NRP Waste:
Potential Feed for Pyrolysis Process

PART II: Alternative to NRP Landfilling: JBI Inc. "Plastic2Oil" (P2O) Process

The P2O process is a highly automated pyrolysis process that converts plastic waste to in-spec consumer-ready synthetic oil. The process was designed by the American company, JBI Inc. and its Niagara Falls operating facility was visited by EEC in Sept. 2012

Input	Plastic waste (except #3 PVC and #7-nylon)
Output	No. 6 oil: in-spec, ultra-low sulphur (<16 ppm) No. 2 oil: in-spec Naphtha: requires further blending Petcoke: residue with potential to sell
Maximum Capacity	48 tons/day
Yields	86% HC content, 10-12% off-gases, 2-4% Petcoke
Energy input	Powered by off-gases produced during pyrolysis
Emissions	Low; Passed CRA stack test; Meets NYSDEC criteria



P2O Process Flowsheet