What is Happening Out There?: Future Trends in Recycling Processing

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G.A.A. Background

- Governmental Advisory Associates,Inc. is a research and consulting firm focusing on solid waste management issues.
- Serves as consultant to federal, state and local governments and the private sector.
- Conducts periodic studies and surveys of solid waste facilities—recycling facilities, waste-to-energy, and landfill gas to energy.

Elements of Presentation

- Where is MRF Processing Today
- Where is MRF Processing Going

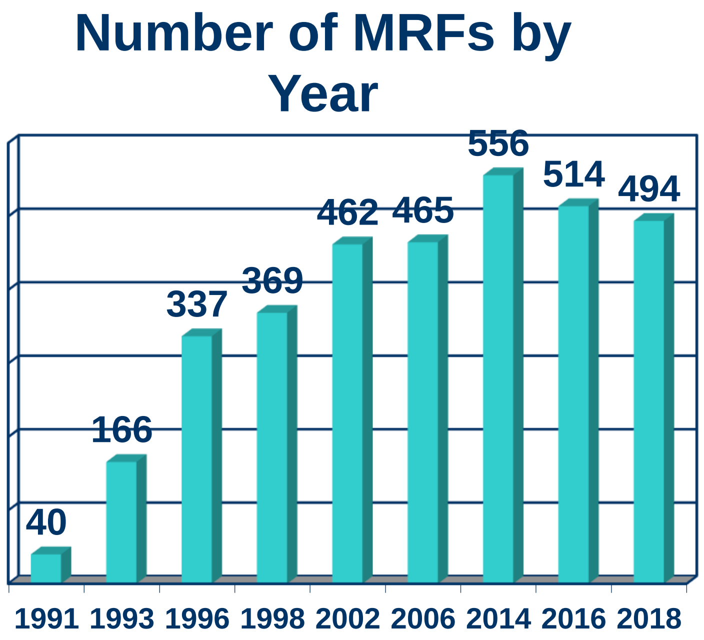
Materials Recycling Facility Survey

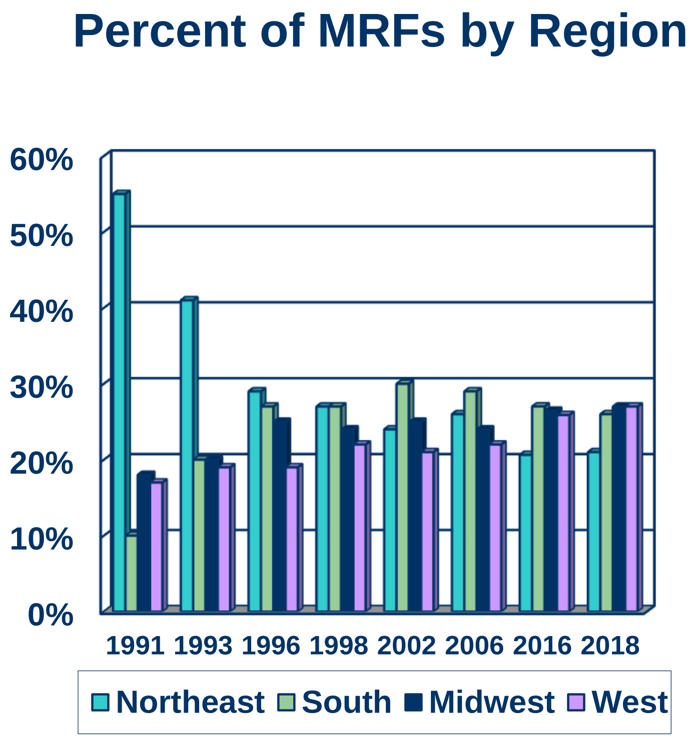
- Since 1990, firm has been surveying recycling facilities in the United States.
- Results published as ***Database of Materials Recycling and Processing in the United States***
- Information obtained from variety of sources, including telephone contacts, annual reports, budgets, etc.

Where Are We Today

- MRF Industry is in a mature phase. While not many new facilities are being sited and developed, there is considerable retrofit and upgrade activity.
- Most MRFs, two-thirds, are taking and processing single stream materials, compared to about one-fourth ten years ago.
- Average throughput has increased over the years to about 200 tons per day.
- Residential/commercial diversion has plateaued. Recycling rates range from about 28% to 34% nationally.
- MRFs are largely are owned and operated by the private sector--70% of facilities. These facilities face profitability pressures.
- There have been ownership consolidation of facilities, with integrated firms taking over independent and regional operators.

Maturation of the Industry





Other Factors Impacting Today's MRF

- There has been considerable market volatility in certain materials over the last several years, creating market uncertainty.
- High residue rates are plaguing MRFs, in range of 25-35%
- Waste streams are changing
  - More complex, lighter stream, i.e. multi - layered plastics
  - Decrease in tin cans, glass, ONP
  - Amazon and "Blue Apron" impact- small OCC packages
  - Aspirational recycling resulting in wide array of non-recyclables in the bin.

Private Sector Recyclers Under Stress

- Choosing not to renew contracts
- Sharing risks of market volatility.
  - Implementing base processing fees.
  - Fees are in the $35.00 to $70.00 range before revenue sharing
- Sharing in burden of customer education
- Re-thinking service levels
  - Reducing types of material or imposing additional costs for certain materials
  - Moving from weekly to bi-weekly collection

Where We Are Today: Markets

- Markets, markets, markets –China!!
  - National Sword
  - Strong import restrictions based on residual content to .5% in bales. On-site customs inspections.
  - Proposing full ban on all recovered materials by 2020.
  - Huge Impact on MRFs. Many had been exporting 60 to 70% of materials
  - Other markets, India, Indonesia, Vietnam have not made up for the loss of the Chinese market.
- Lower prices for some materials and overall market volatility
- Tariffs having additional impacts
  - Equipment Prices, Baling wire
  - Uncertainties with Chinese Markets, possible future retaliatory actions.
- Transportation Pressures
  - Trucking prices increases due to driver shortages and other factors.
  - Transportation companies shifting pricing risks to MRFs.

Where We Are Today: Technology

- Single stream MRFs pushing technology
  - Increase sortation capacity
  - Reduce residuals in bales
  - Example, optical sorters now found in 60% of all MRFs, mainly for plastics, but increasingly for fiber.
- Continually evolving technologies within the MRF, i.e. robots, A.I., new types of screens, separators, mobile system feedback technology
- Paradox
  - Technology supports less sorting at the curb, while markets are demanding an increasingly higher quality product.
  - Sorting costs are increasing in volatile market environment

Where We Are Today: Operations

- Growing Selectivity on Materials
  - **Glass** – About 20% of MRFs not taking glass
  - **Plastic**- Most facilities not taking plastic film or rigids. Some processors are stockpiling mixed plastics or only accepting PET and HDPE.
  - **Aseptic**- Facilities have been accepting aseptic containers. They are taken in about 50% of facilities.
- Slowing down of lines, increase in shifts to lower residual rate
- Restructuring supply contracts to incorporate a processing fee.
- Increasing consolidation. Integrated national and regional solid waste firms are taking over from materials processing firms. About 40% of facilities owned or operated by national/regional refuse hauling firm.

Where Are We Going: Markets

- Chinese plastics processors are already building processing plants here, to avoid Chinese import restrictions.
  - They will take plastics and further clean and flake them for export.
  - Purchasing shuttered mills mainly in the southeast
- Move to build out or ensure a secure domestic infrastructure for mixed fibers, certain plastics, in some cases with help of state and regional authorities
- Refinement of sorting approaches to meet market standards.
- Research to examine feasibility of additional uses for materials such as plastic, particularly in energy production.
- Efforts to integrate product design and sustainability to enhance end of life marketability.

Where Are We Going: Technology

- Push to incorporate AI and robotics to create more efficient sorting and replace workers.
- Improve 2D/3D sortation with ballistic separators and more advanced optical technology.
- Build a flexible system that can adjust to various mixes of materials as the markets dictate.

Where Are We Going: Operations

- Disappearance of smaller, “mom and pop” MRFs. MRF most likely to be owned by national/regional hauler.
- Boundaries are blurring between types of facilities, i.e. transfer station hybrids, dry commercial MRFs, mixed waste facilities, single material facilities.
  - Construction of MRF/RDF facilities in certain areas, i.e. South Carolina, Montgomery AL, Hampden, ME.
- Implementation of food waste recycling, which could change the nature of the MRF stream, i.e. remove contaminated fiber.
- Move to different streams, two stream organic/inorganic or three stream, food and yard waste, recyclables, residue.

Characteristic of a Future MRF

Characteristic	2018	2028
Incoming stream	Single stream- recyclables	Modified mixed waste- non-organic portion or mixed waste
Size	150 tons per day	500+ tons per day after organics
Owned/Operated	Private firm/Private Firm	Public Sector/ Private Sector or All Private- Integrated Firm
Technology	Optical sorters	High level sortation technology/robotics
Main Source of Revenues	Material revenues with some fees.	Processing Fee with some revenue share
Products	Sorted recyclables	Sorted recyclables +

Characteristics of Future Processing Plant

- Segmentation of waste streams- organic/inorganic.
- May be the front end of an energy production plant.
- Modified mixed waste processing plant, in which organics would go to composting or anaerobic digestion and inorganics, sorted.
- Appropriate residue used as a fuel for cement or other industrial boilers.
- In all probability, these plants would have to be partially subsidized by public sector under certain market conditions or owned and operated by an integrated solid waste firm.

Some Questions About the Future

- Is technology outstripping economic feasibility?
  - We can sort faster and better, but not all the materials have sufficient quantity or value.
  - Global markets are becoming more discerning, demanding a higher quality product, while the feedstock has become degraded through contamination.
  - Consumer packaging is oriented to convenience, but continues to pose recycling challenges.
- If curbside organics/food waste collection becomes standard practice, where will the MRF fit in?
- Will there be a move to a more segmented residential waste stream, with storage and removal built into the house of the future.
- Will there be passage of a European model of legislation, mandating pre-treatment all waste prior to disposal

Thank You!

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