# Recycling and the State of MRFs: 2006 and Beyond

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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.

# Materials Recycling Facility Survey

- Since 1990, firm has been surveying recycling facilities in the United States.
- Results published as ***Materials Recycling and Processing in the United States: Yearbook and Directory.***
- The next edition, the 6th, will be published by Summer 2007.

# Organization of Presentation

- Overview of MRF developments in the United States.
- Specific findings with respect to the Northeast region and New York State .

# A Few Caveats

- Data covers Materials Recycling Facilities (MRFs) only.
- Excluded from the survey are:
  - Mixed Waste Processing Facilities (MWPFs)
  - Recycling centers, where no sorting is occurring.
  - Bale and ship facilities
- Data is still preliminary.

# What is a MRF. A Facility Which…

- Processes multi-material or multi-grade stream of source separated material for marketing to end users, brokers or value-added resellers.
- Receives some fraction of this stream as commingled recyclables requiring further sorting.
- Is part of a locally structured solid waste program, obtaining some percentage of the residential/commercial MSW stream.

# Study Methodology and Source of Data

- Conducted a state-by-state survey of MRFs
- Used previous surveys as the base list. List of facilities updated through government documents, trade publications, conferences, contacts with state and local officials.
- Obtained information through multiple telephone contacts with MRF operators and state and local officials. Also used government and company reports.

# Recycling Environment as of 2007

- Demand for secondary materials, fiber, plastic and metals are high. Markets are becoming more demanding as to quality.
- There is competition for quality secondary materials, fiber, plastic or metals.
- Overall solid waste disposal prices are rising due to increased transport costs, capacity bottlenecks, and regulatory issues.
- In some areas, there has been a flattening of recycling rates and amounts.

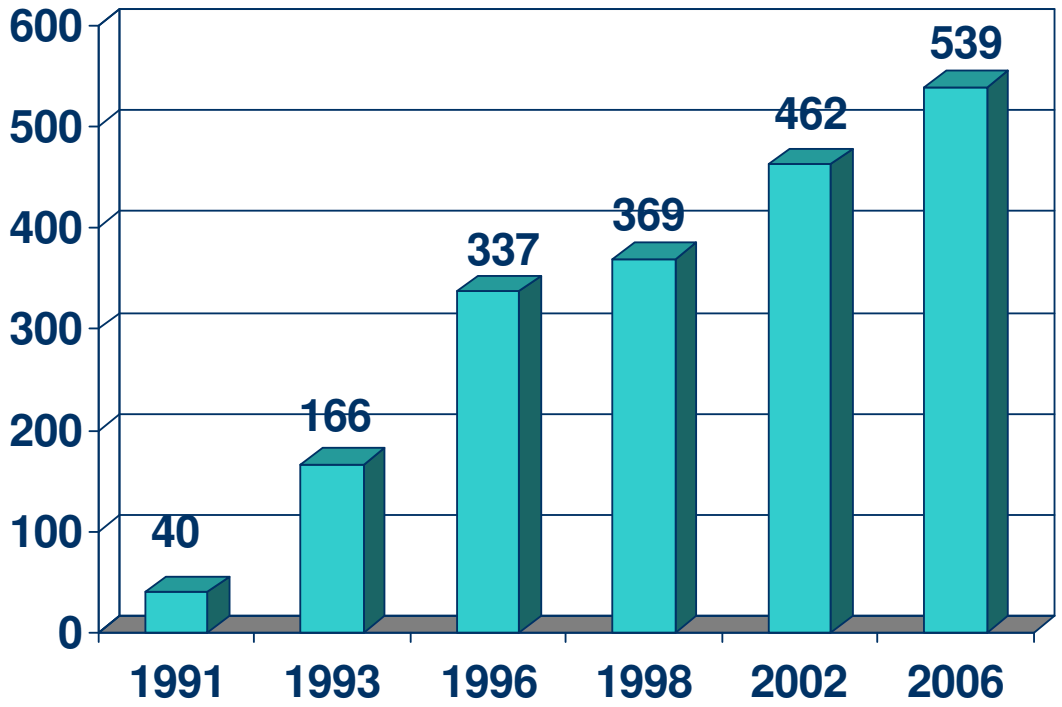
# Trends in MRFs in United States

- They are getting larger. Smaller facilities are closing in favor of regionalized projects.
- There is continued growth across the United States of single stream curbside collection programs and therefore, single stream MRFs.
- In conjunction with two first points, more facilities are relying on mechanized and computer-based sorting equipment
- In some areas, glass is being taken out of curbside programs or in some way, handled separately.

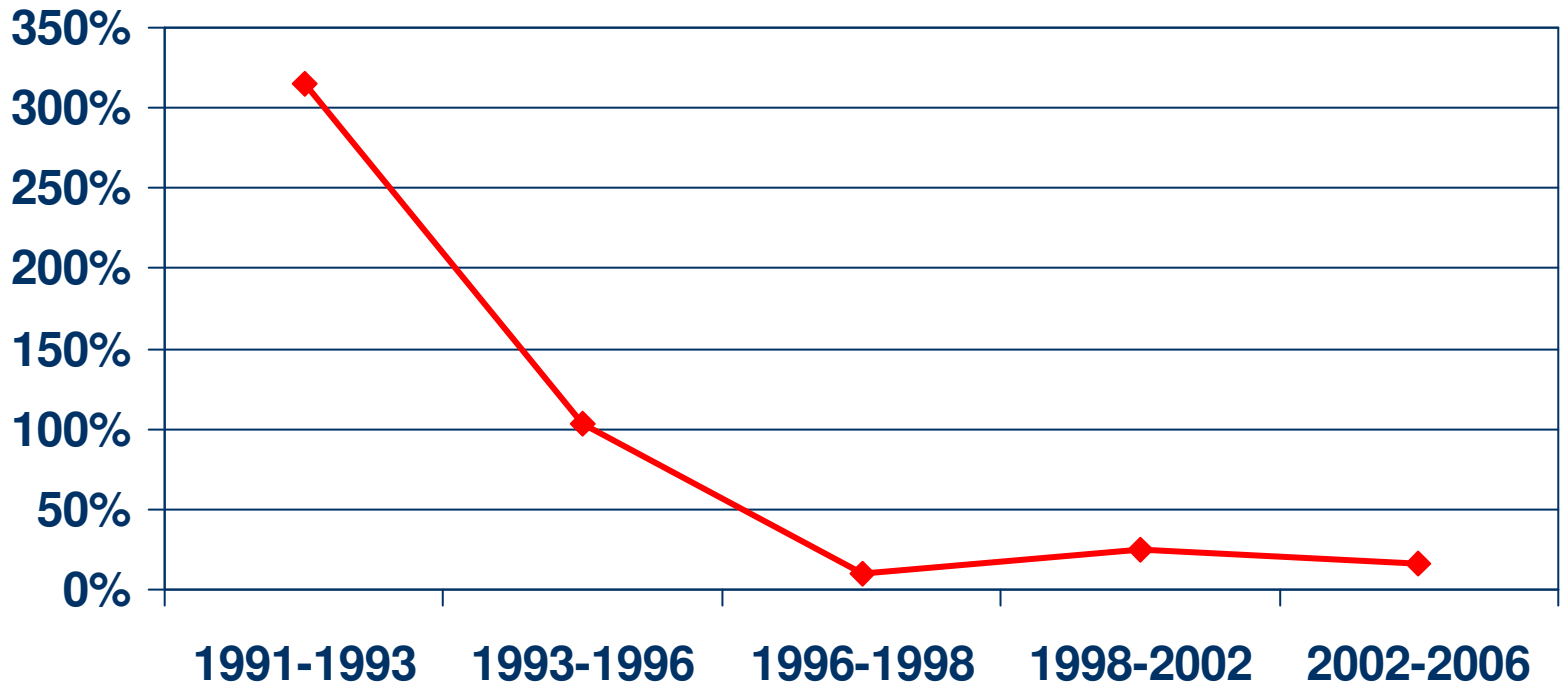
# Growth in Number of MRFs

- Figure 1 shows increase in numbers of facilities.
- There is growth in numbers, but the growth rate is slowing, due to saturation throughout the country and closure of small plants in favor of larger, regionalized facilities.
- The changing rates of growth are illustrated in Figure 2.

# Figure 1: Number of Operating MRFs in the United States



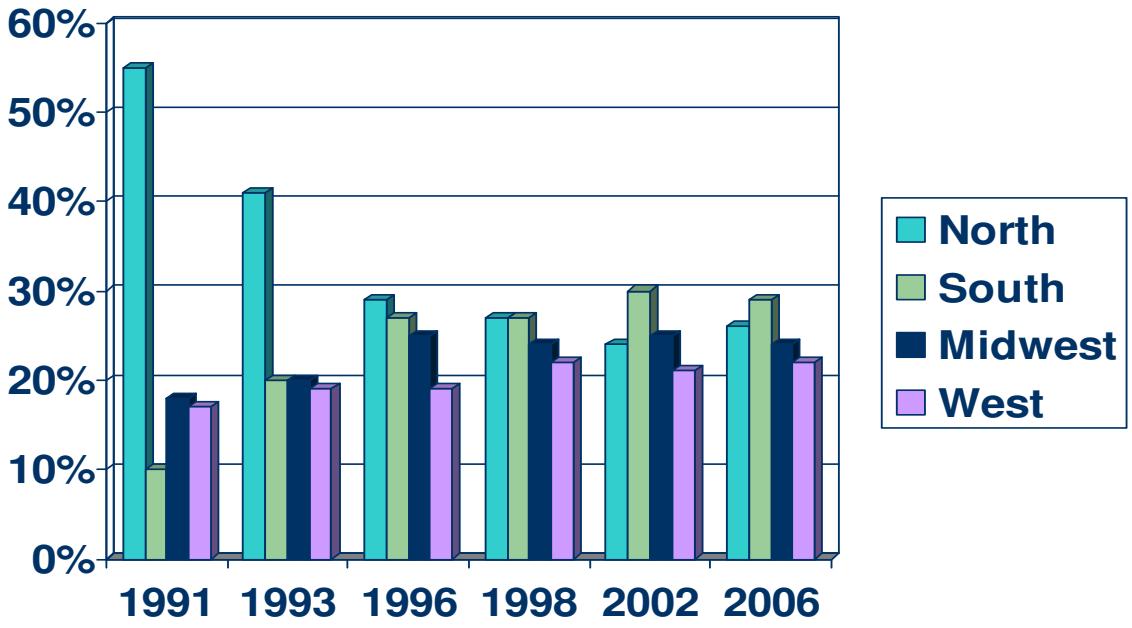
# Figure 2: Percent Growth in Number of Operating MRFs



# Some Examples…

- **Denver, CO** – City went single stream. A MRF in the city was retrofitted to accept the stream. A MRF in a county to the North is ceasing operations and will serve as a transfer facility to Denver
- **New York, NY** – With the City's 2004 processing contract, four MRFs were replaced processing commingled containers were closed. Materials are processed at one main facility and a satellite facility.
- **Chicago, IL** – A major MRF in area is purchasing mixed recyclables from the region. Various smaller facilities have closed and are shipping their recyclables to this large MRF.

# Figure 3: Distribution of Facilities by Region



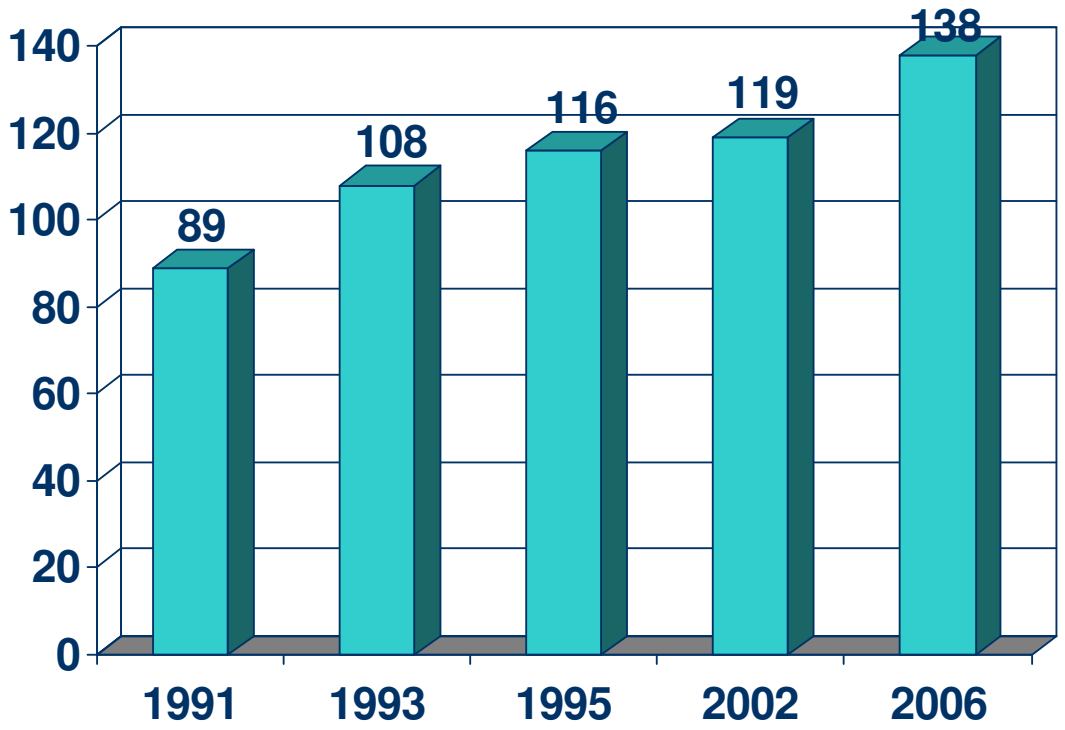
# Regional Distribution of MRFs

- At the outset of widespread implementation of curbside municipal recycling, the Northeast led the way with respect to processing facilities.
- Currently, municipal recycling is national. No region dominates.
- This development is a result of state policies, markets for secondary materials, and the cost of solid waste disposal
- As has been documented, nearly every locality and most rural areas have the opportunity to recycle. There are now processing facilities in every state, with one exception.

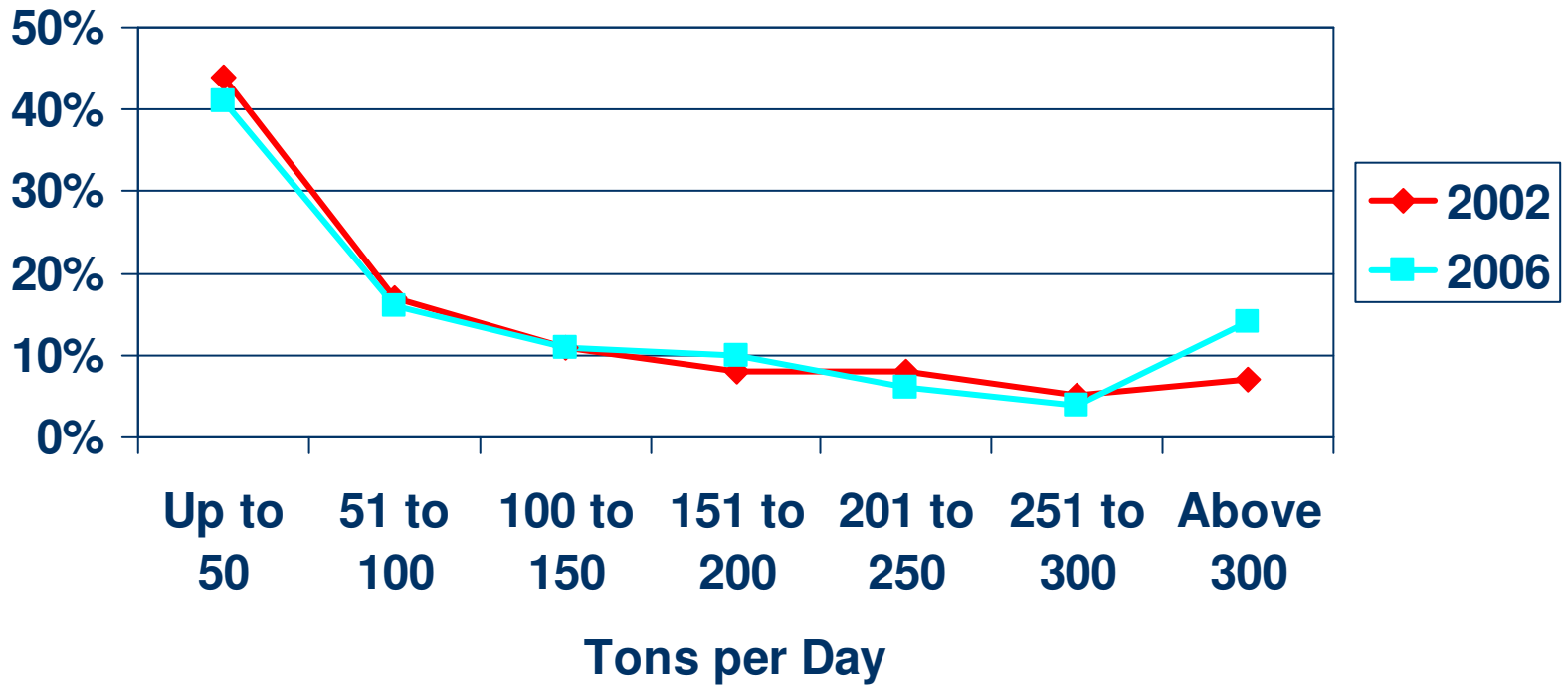
# Size of Projects- Daily Throughput

- On average, daily throughput at MRFs has increased.
- While there are still small facilities in the 1-25 tpd range serving less densely populated localities, many other such projects have shut down.
- The median tonnage throughput is 73 tons. Thus, one-half of the operating projects, or about 220 facilities, are processing less than 73 tons per day, with 27% processing 25 tons per day or below.
- There has been a 16 tpd increase in the median, since 2002 from 57 tons per day to the current 73.

# Figure 4: Size of Operating Facilities- Average Tons Per Day Throughput



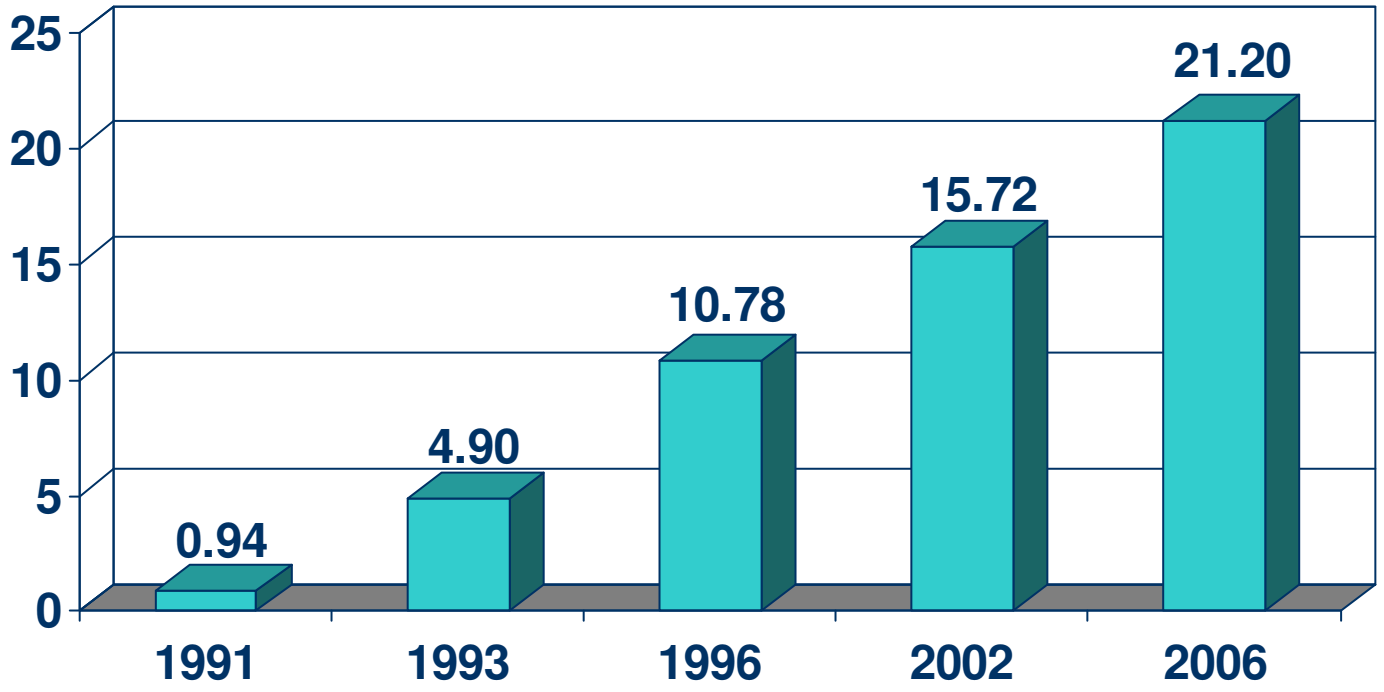
# Figure 5: Distribution of MRFs by Size



# Size of Projects – Annual Throughput

- There are increasing amounts of recyclables processed at MRFs
- The increase is a function of the growth of capacity and quantity of MRFs.
- Much of the tonnage growth is coming from fiber. In some cases fiber now constitutes 90% of the stream.
- Growth is also the result of extending commercial recycling in urban areas.

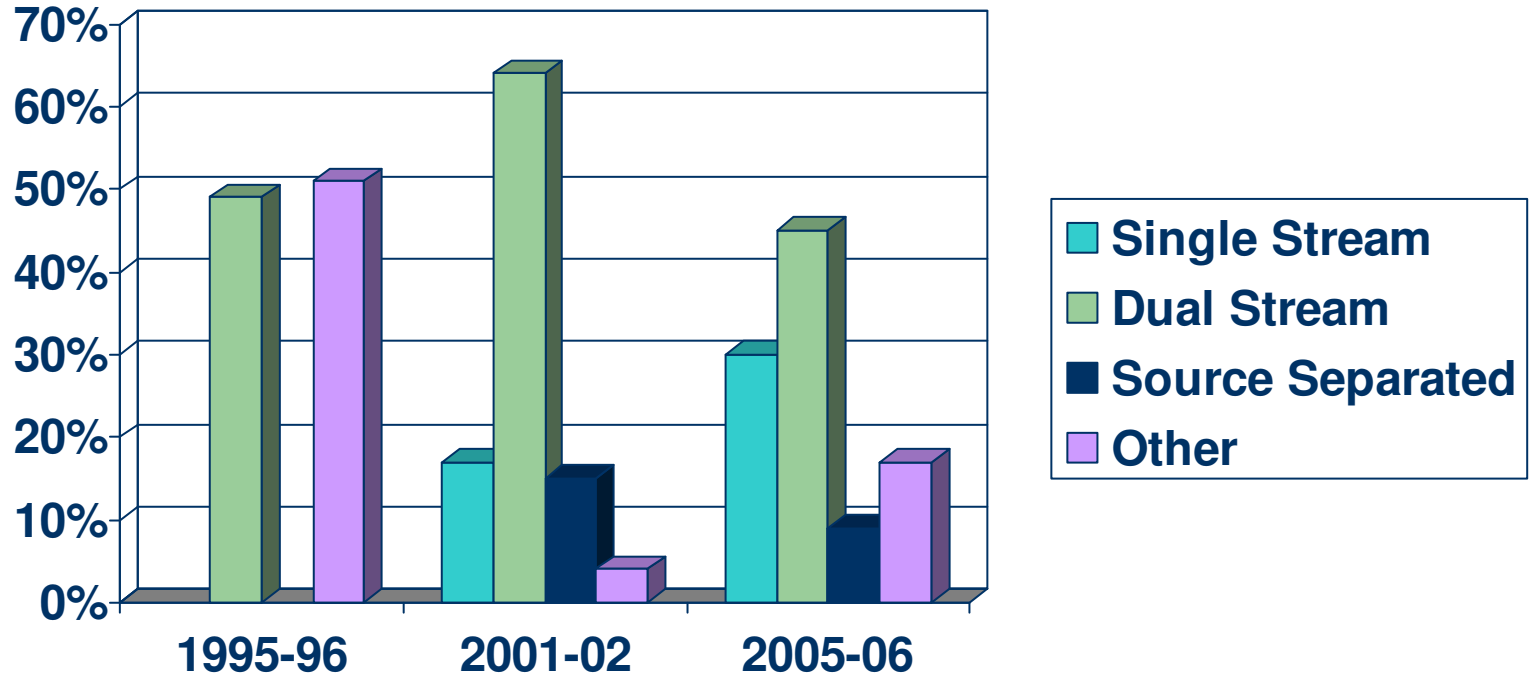
# Figure 6: Annual Throughput in Millions of Tons



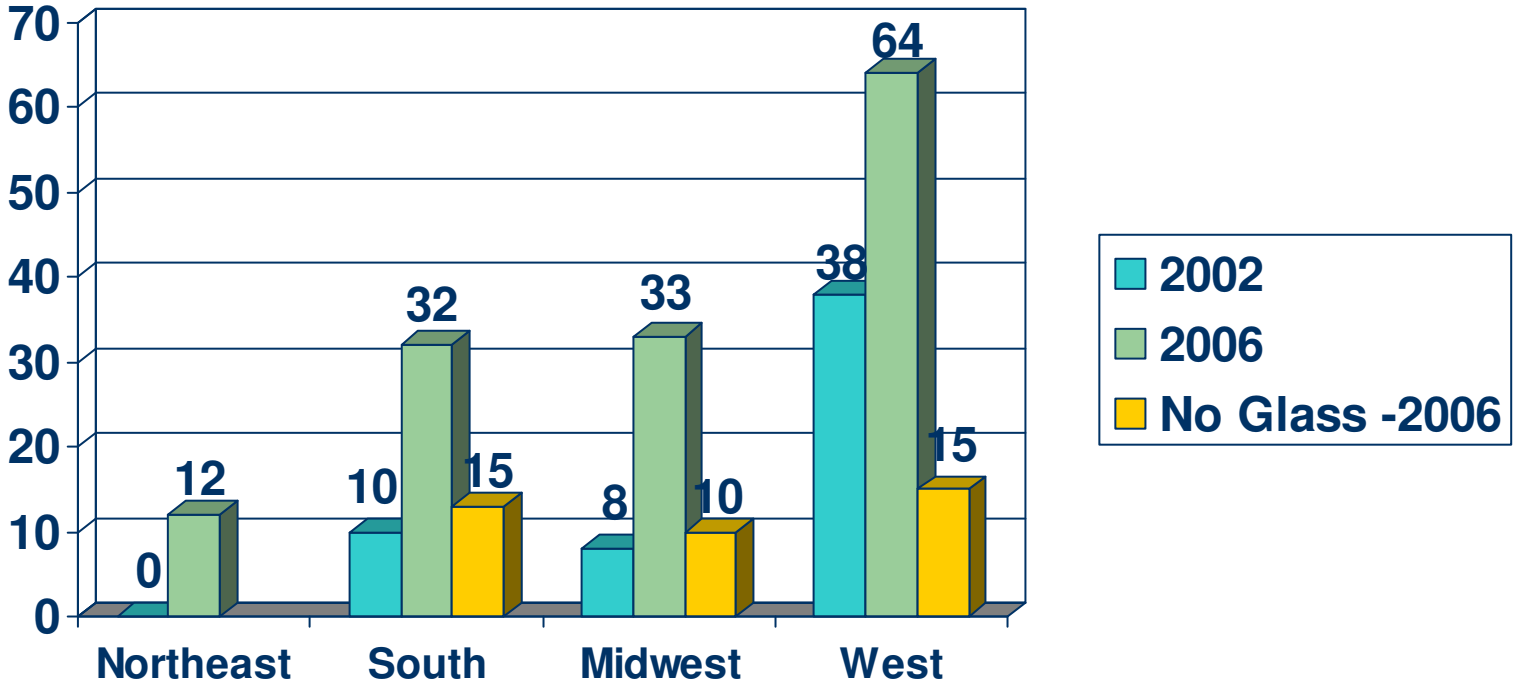
# Increase in Single Stream Curbside Collection Systems

- Single stream collection is where residents place all their recyclables, fiber and MGP, in a single container, which is picked up at the curb.
- This system reduces collection costs and may increase participation and tonnages of recyclables processed.
- Single stream collection places a larger burden on processing.
- In part single stream implementation has resulted in larger and more mechanized MRFs.
- There is increasing regional dispersion of these single stream collection programs.

# Figure 7: Categories of MRF Inflow Streams



# Figure 8: Geographic Distribution of MRFs Serving Single Stream Systems: 2002 and 2006



# Table 1: Residue Rates by Type of Inflow Stream

| Inflow Stream | Glass Included | Glass Not Included |
|---|---|---|
| Single Stream (# of Cases) | 12.0% (89) | 9.1% (28) |
| Dual Stream (# of Cases) | 6.7% (161) | 5.8% (21) |
| Source Separated (# of Cases) | 2.4% (24) | N.A. |
| Other (# of Cases) | 4.8% (60) | 3.6% (9) |

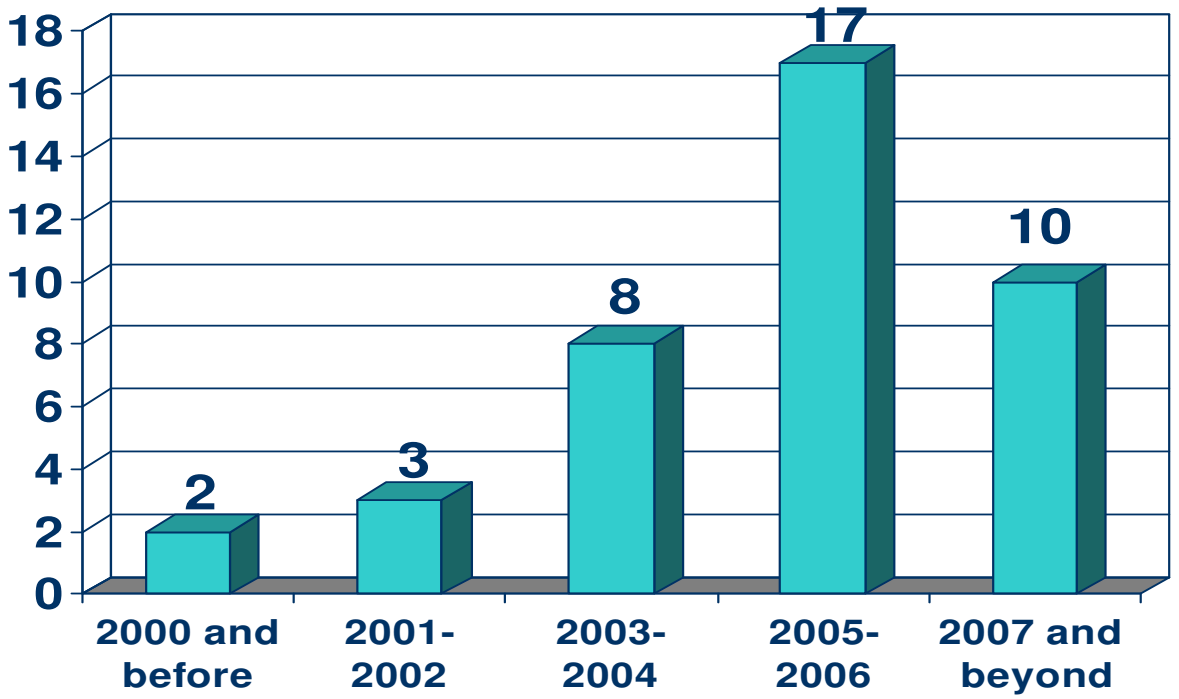
# Table 2: Initial Average Capital Costs of MRFs by Inflow Stream

| Type of Stream | Average Cost | Number of Cases |
|---|---|---|
| Single Stream | $5, 580, 000 | 32 |
| Dual Stream | $3, 008, 956 | 114 |
| Source Separated | $1, 503, 333 | 6 |
| All Facilities | $3, 675, 026 | 199 |

# Increase in Mechanization Of Processing Equipment

- As MRF throughput increases, the need for efficient and effective processing increases
- Single stream program pose challenges for sorting, requiring equipment that can respond to the need for a quality end product.
- Trend is toward increased reliance on integrated sort systems, incorporating disk and star screens. Use of disk and/or star screening systems are found in nearly 200 Multi-Material MRFs, about 45% of the operating facilities.
- MRFs are beginning to use optical sorters for fiber, plastics or glass.

# Figure 9: Number of Operational MRFs Using Optical Sorting Equipment by Date Installed



# Growth in Use of Optical Sorting Systems

- Through 2002-there were 5 facilities that had one or more optical sorters.
- Five other MRFs had installed optical sorters through 2002, but they closed or took out the sorters due to operational problems.
- After 2002, at least 25 facilities have installed optical sorting systems. In addition, 10 projects have invested in optical sorting machinery for installation in 2007 or have indicated that they will probably use optical sorters in the future.

# Optical Sorters Used For…

- Majority of sorting equipment devoted to plastic sorts. In fact 80% of the optical sorting systems are for plastic.
- Second greatest reliance is for fiber sorting, obviously in facilities handling large tonnages of fiber. Such systems constitute 14% of the total.
- Many of the early optical sorters were used for glass. Some of these sorters are no longer in use, since glass no longer has strong market outlets.

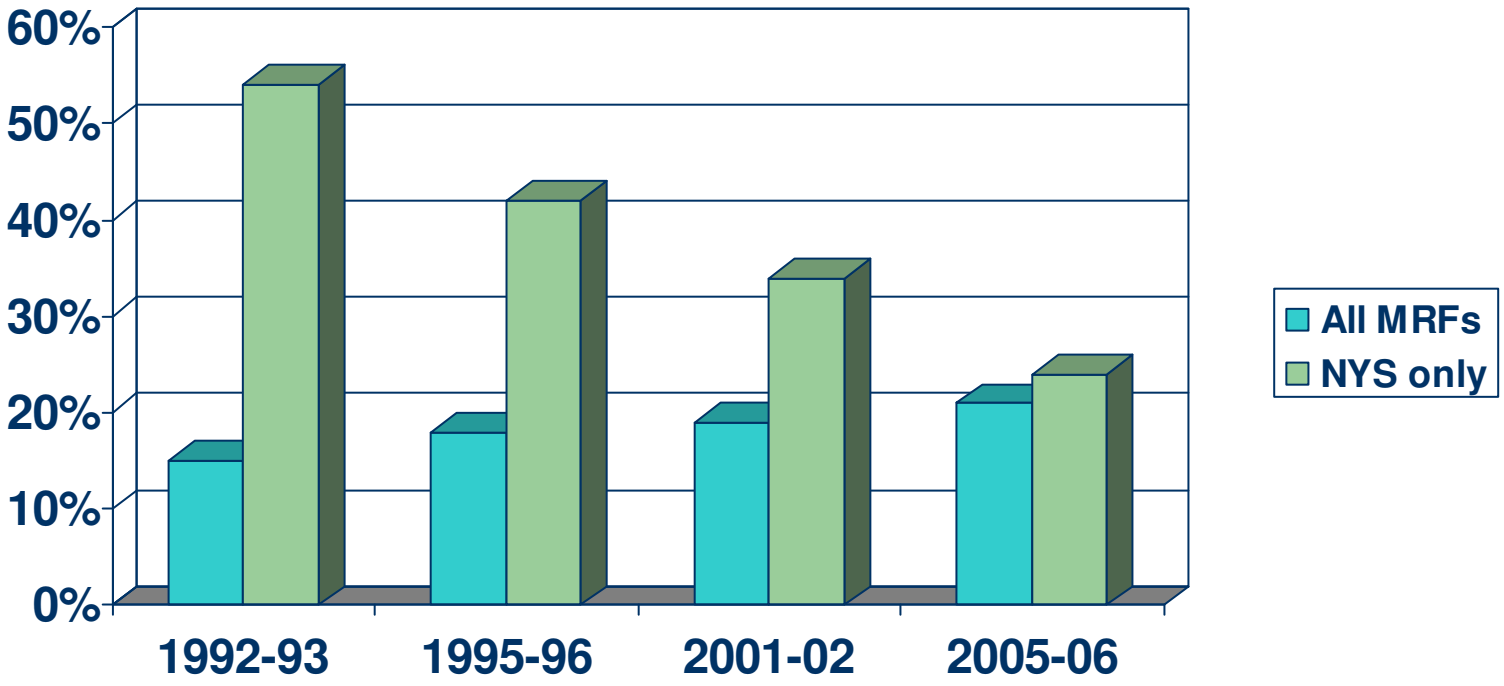
# Specific Regional Trends: Northeast

- Continues to rely on dual stream recycling.
- Single stream is definitely coming. MRFs have been constructed in Vermont, Massachusetts, Pennsylvania, New York, and New Jersey and are being procured in Connecticut
- Faces rising cost of solid waste disposal. After the closure of New York City's Fresh Kills Landfill, nearly 20,000 tons per day of NYC waste is being disposed through area disposal sites. This has driven up disposal costs and has made recycling an attractive alternative.
- New York City, after suspending its recycling program in the early 2000 has full reinstated it and has signed a 20-yr. contract with a single firm to process its metal, glass and plastic. A state-of-the art MRF is being constructed.

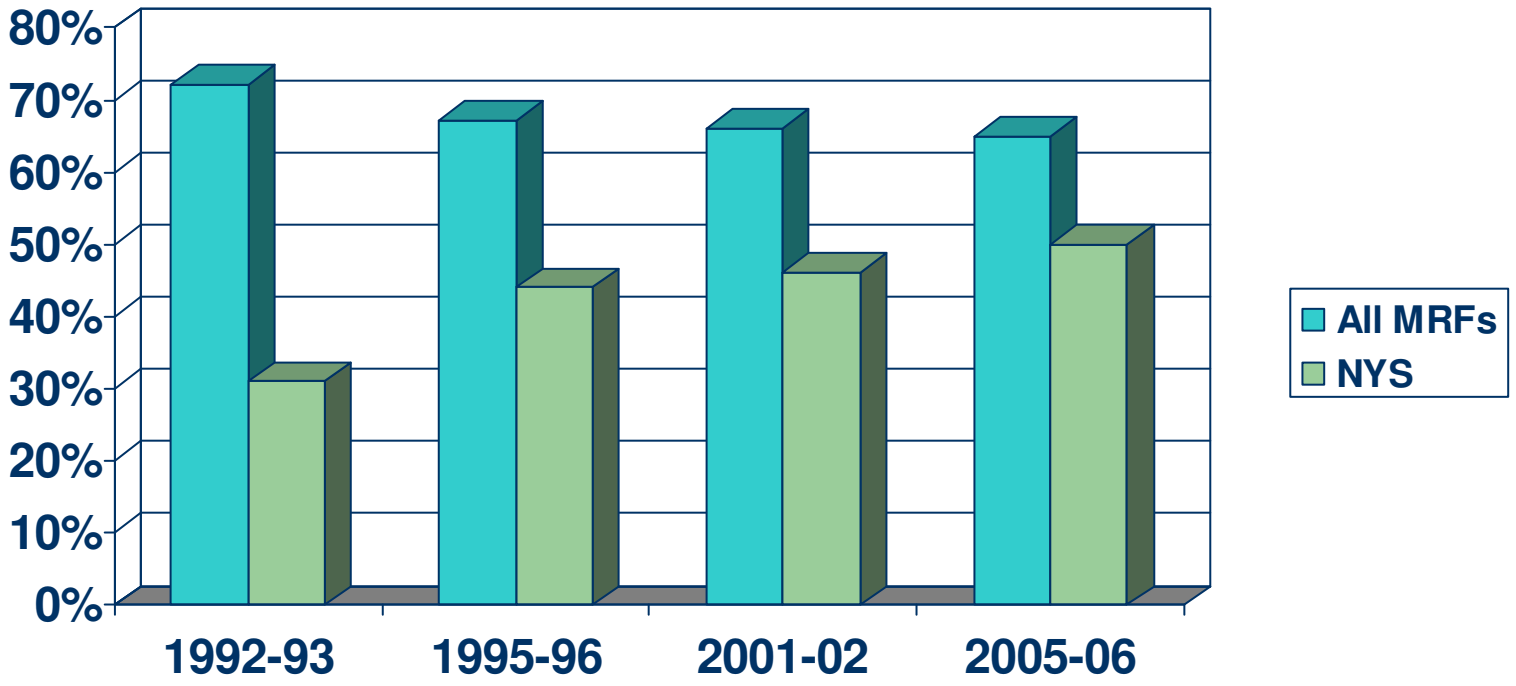
# Trends in New York State

- Introduction of single stream MRFs
- Privatization of MRFs
- Loss of MRFs as a job development tool.

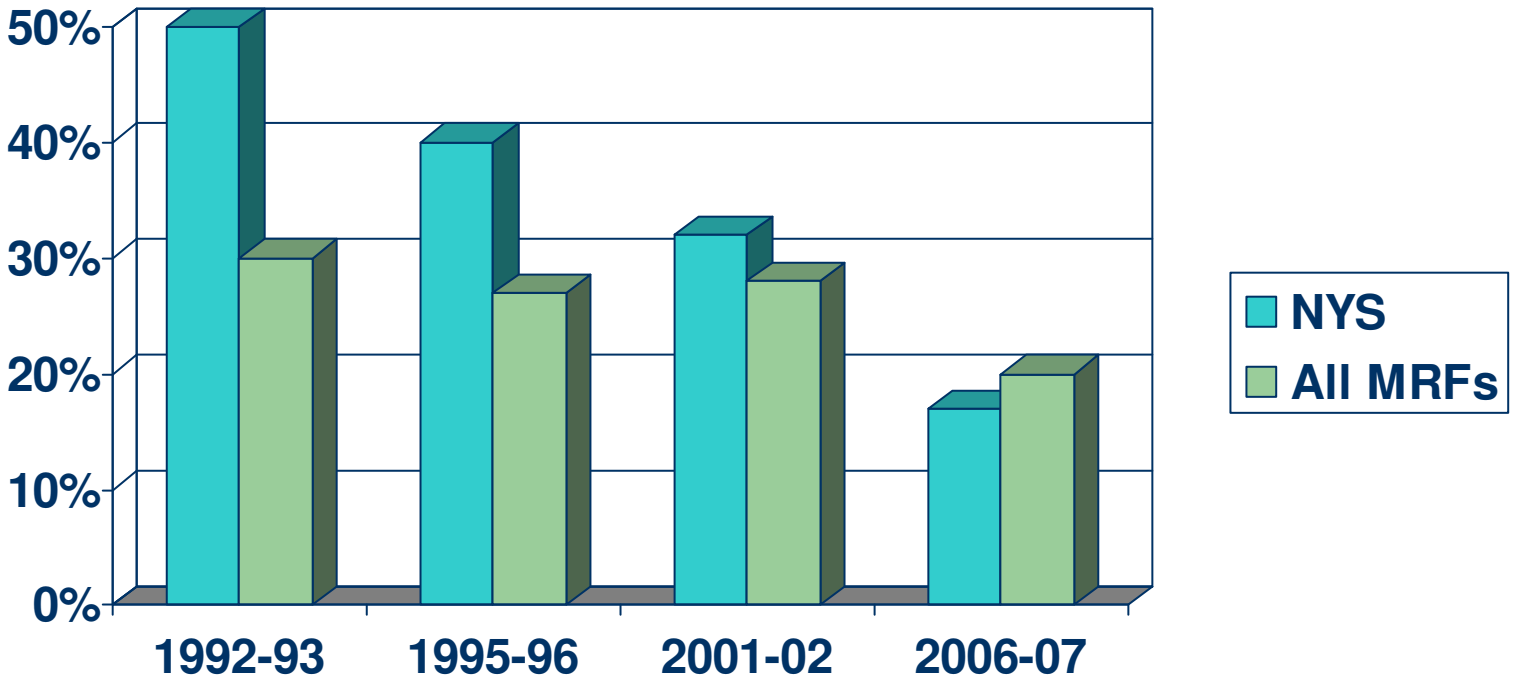
# Figure 10: Public Sector Ownership and Operation of MRFs- U.S. and NYS



# Figure 10: Private Sector Ownership and Operation of MRFs – U.S. and NYS



# Figure 12: Percent of MRFs in U.S. and New York State Using MRF for Job Development or Placement



# Some Thoughts About the Immediate Future

- MRFs are getting larger. Regionalization will continue.
- MRFs are becoming more mechanized.
- Single stream systems are continuing their march eastward, which is accelerating
- Curbside programs are expanding in terms of materials being accepted, particularly with respect to fiber and plastics. However, particularly in the Northwest and South, glass has been or will be dropped from municipal programs.
- Global markets are becoming more discerning, demanding a higher quality product.
- If growth rates of China and India are sustained, there will be continued demand for secondary materials.

# Some Thoughts about the More Distant Future

- Role of sustainability models
- More aggressive recycling in the commercial sector
- Re-design of office and home to accommodate resource conservation.
- “Back to the future”—sorting at the source and not at a centralized facility.

# Questions??

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