

Increasing Waste Diversion – Beyond Recycling

NHDES - April 7, 2021

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Northeast Resource Recovery
Association



Agenda

1. About NRRRA
2. Intro to Waste Reduction
3. **Waste Diversion Strategies**
4. Group Discussion



2019
ONE YEAR

400+
MEMBERS

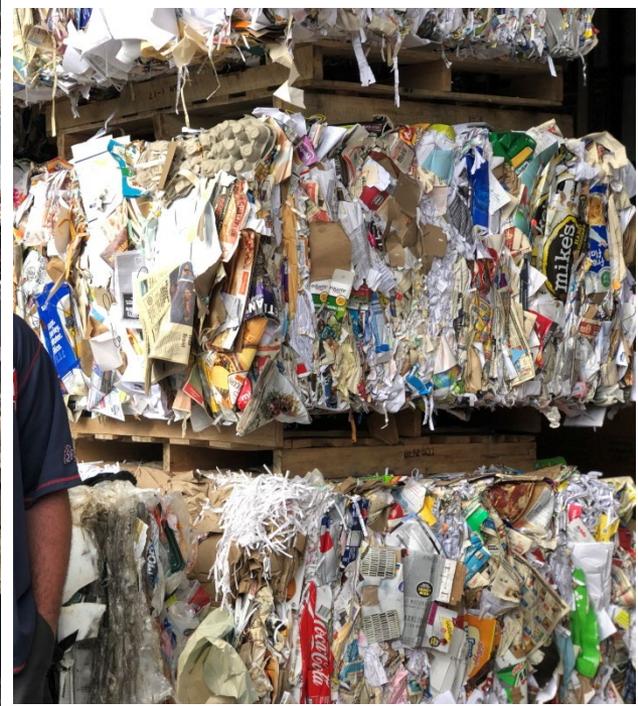
50,351
TONS OF RECYCLABLES &
MUNICIPAL SOLID WASTE

Recycling non-profit that enables communities to manage their own recycling programs



Cooperative Marketing and Purchasing

- Connect municipalities selling recyclables to companies that purchase recyclables
- Returned \$1.8 million to members in 2019





Education & Technical Assistance

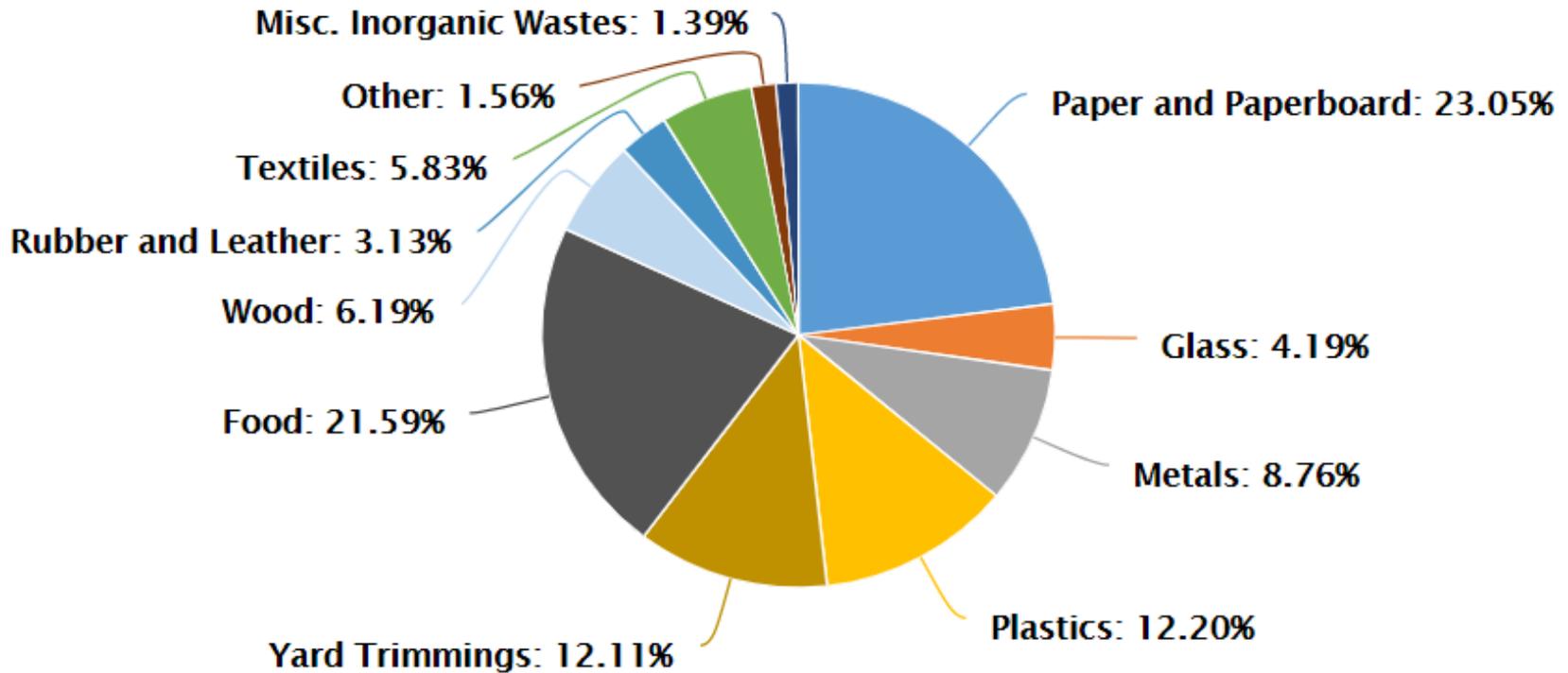
- Meetings, site visits, annual conference
- Hands on technical assistance
- School recycling programs

Intro to Waste Reduction

Why it Matters &
Measuring Progress

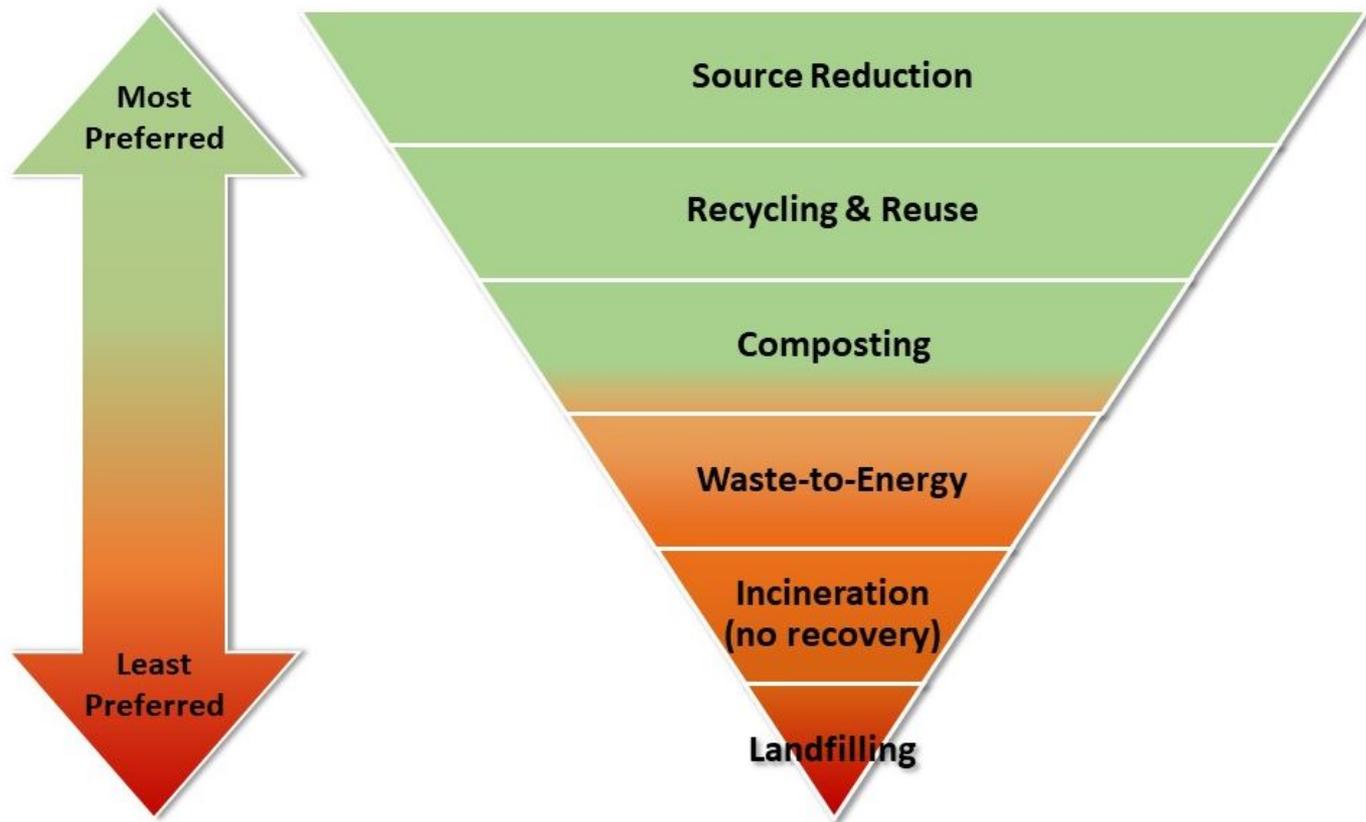
Total MSW Generated by Material, 2018

292.4 million tons



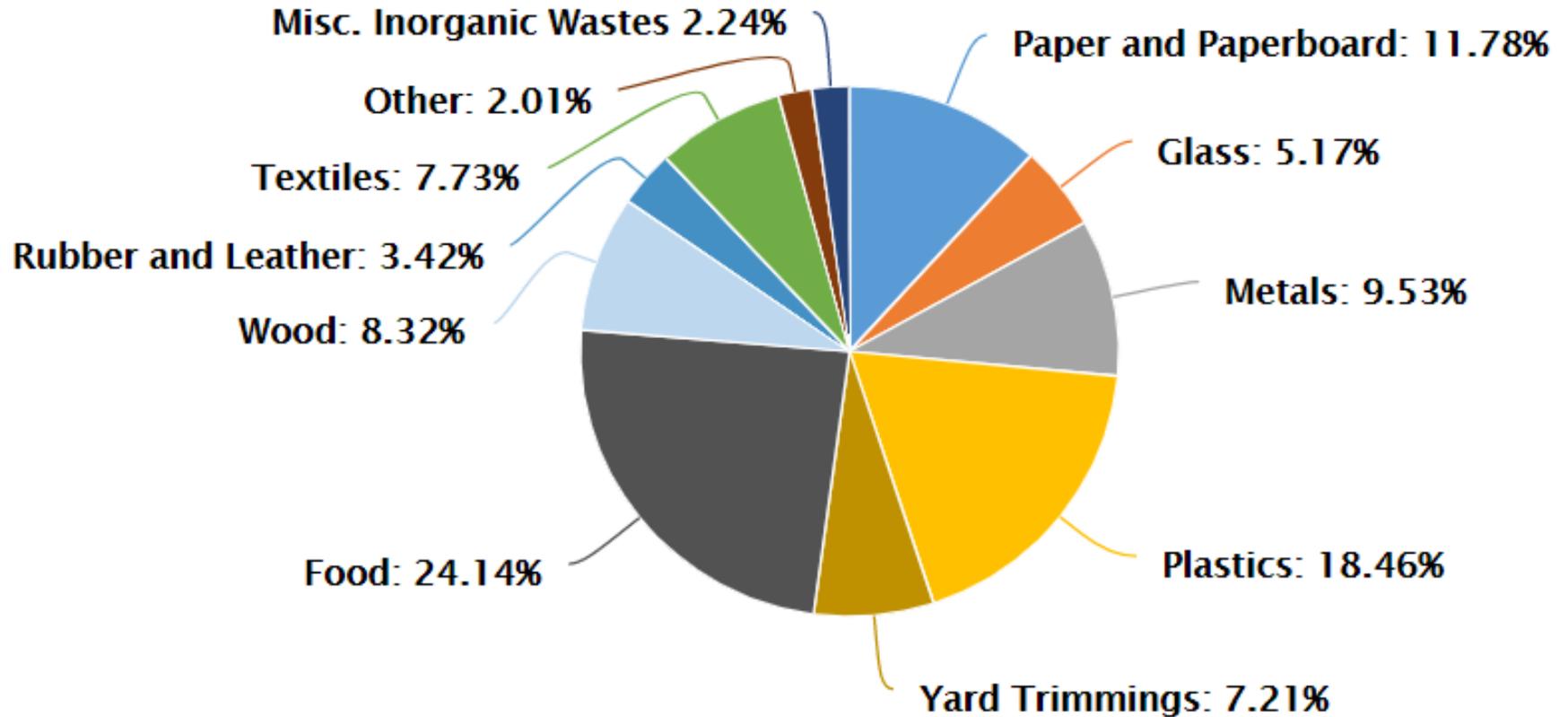
National Numbers from the Environmental Protection Agency

NH Waste Reduction Hierarchy



Total MSW Landfill by Material, 2018

146.1 million tons

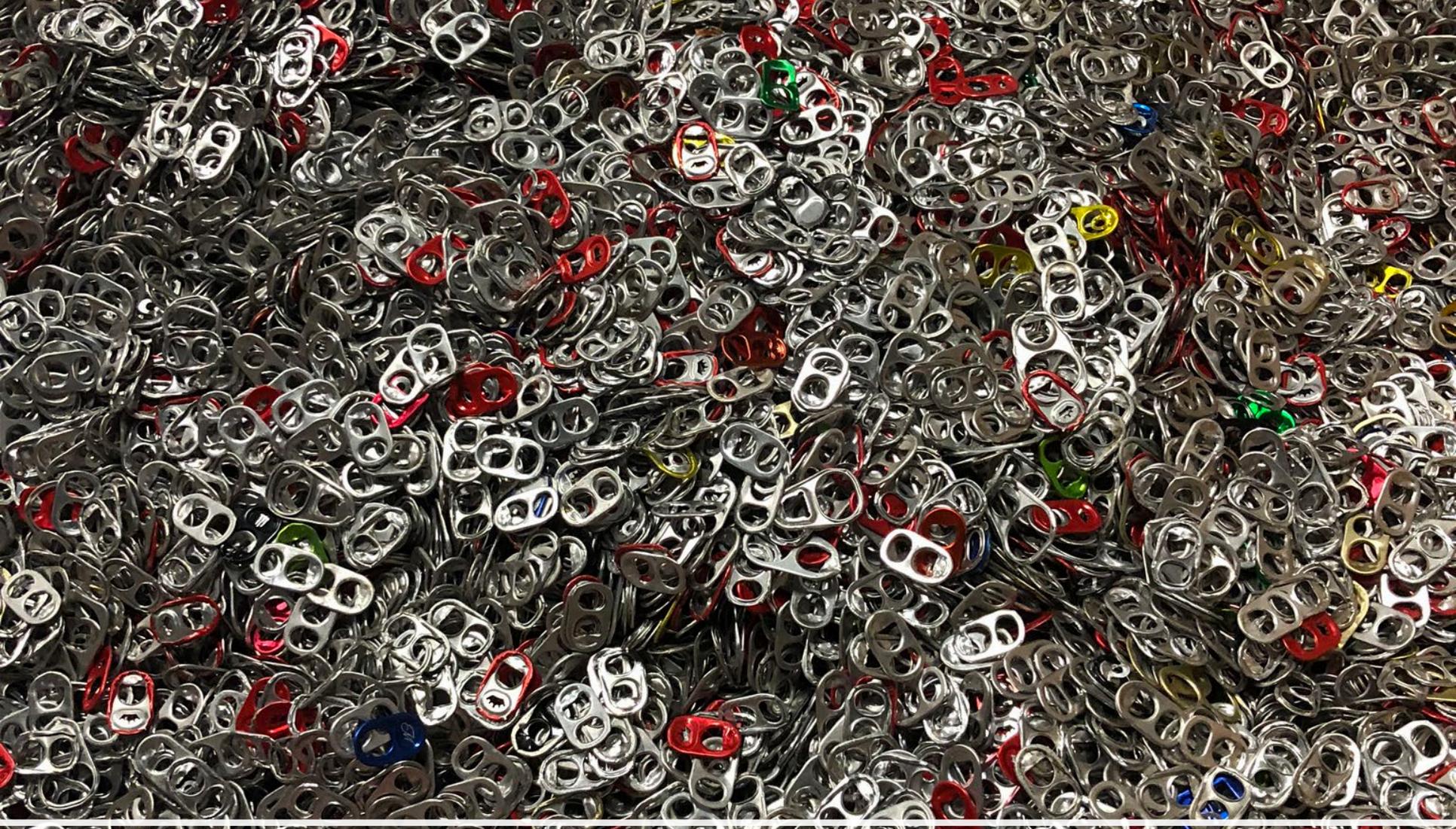


National Numbers from the Environmental Protection Agency



Disposal of Solid Waste in NH

- 6 landfills, 1 incinerator
- 50% of trash disposed of in NH comes from out of state (mostly from MA)



Why Increase Waste Diversion?



Conserve Financial Resources



Waste diversion can help avoid higher cost of municipal solid waste disposal



Though not always true with single and dual stream recycling when markets are down



Costs of landfilling and incineration will continue to rise

Conserve Natural Resources

- Waste diversion saves energy and natural resources
- Saves valuable landfill capacity for waste that cannot be diverted



Aluminum Example

- Recycling aluminum saves more than 90% of the energy needed to create new aluminum
- Cheaper to recycle than extract more
- Nearly 75% of all aluminum produced is still in use today



Recycling versus Diversion Rates

Recycling Rate:

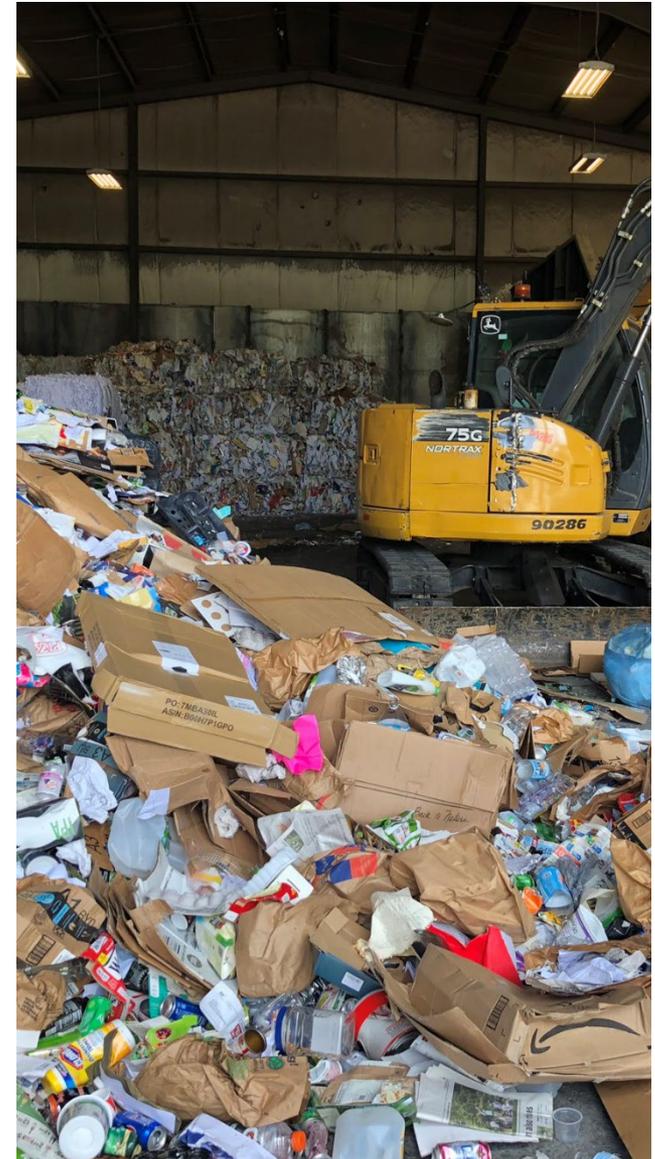
- How much tonnage is recycled versus tonnage thrown away?
- Easier to calculate

Diversion Rate:

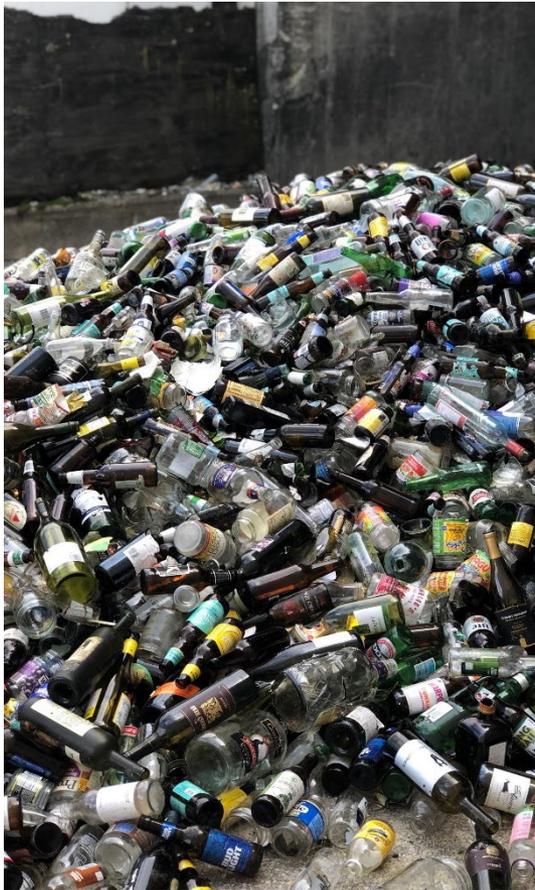
- How much tonnage is diverted away from landfill or incineration?
- Includes recycling, plus more
- Harder to calculate, so must use estimates

Which is More Important?

- Diversion Rate!
- Why? Great to recycle more, but more important to reduce tonnage we send to landfills or incinerators
- **Can reduce tonnage using techniques beyond recycling – focus of today's workshop**



Diversion Rate Calculation



- Diversion Rate % = $\frac{\text{Diverted Tonnage}}{\text{Generated Tonnage}}$
- Need to estimate:
 - How much tonnage diverted away from landfill or incineration
 - How much total tonnage of MSW generated (not just how much thrown away)

Determining Diversion Tonnage

- Could include the following:
 - Recyclables
 - Compostables like leaf and yard waste and food scraps
 - Swap shop materials or other items given away (ex. pallets)
 - Construction & Demolition Debris if recycled (though not part of MSW definition)
 - HHW collection totals



Calculating Diversion Rates - VT



VT requires municipalities to report waste disposed of per capita (per person)



Also gives municipalities clear guidance on how to estimate diversion rates



Estimates must include tonnage of waste generation from businesses and others

High Diversion Rate – Lancaster, NH

Diversion Rate: 60 – 65% (very high)

Reasons?

- PAYT (Pay-as-you-throw) bag system – residents pay per bag for what they throw away
- Extensive recycling program – baling of aluminum cans, cardboard, mixed paper, newspaper, office paper, plastics and steel cans (multi-baler system for efficiency)
- Compost leaf and yard waste, burn brush
- Give away pallets and plastic barrels
- Extensive public education
- Excellent customer service



High Diversion Rate – Littleton, NH

- Over 50% diversion using similar strategies as Lancaster, NH
- Diversion rates can be misleading
- For example:
 - Littleton, NH takes cardboard from neighboring businesses, but not trash
 - So artificially inflates recycling and diversion rates

Simplest Calculation

- Goal: reduce trash being disposed of in landfills or incinerators per person over time
- Calculate per capita disposal rate
- Easier to calculate and track over time
- Tons per person (disposal rate) = total population (including seasonal) / total tonnage MSW disposed
- Pounds per person = (tons per person / 365 days) x 2000
 - Ex. One VT District generates 1.39 lbs. per person per day

Case Study

2.24 total lbs./day generated

(.98 lbs./day recycled)

Community #1 (2020)

	MSW	C&D	Commingled w/o Glass	Mixed Paper	Cardboard	Glass	Total Tonnage/ Pounds
Population 742							
Tons	171	64	16	18	16	18	303
Pounds	342000	128000	32000	36000	32000	36000	606000
Pounds / Person / Year	461	173	43	49	43	49	817
%	56%	21%	5%	6%	5%	6%	100%

Landfill Rate **78%**

Recycling Rate **22%**



Waste Diversion Strategies

Compacting C&D

Composting Food Scraps

Pay As You Throw

Full Cost Accounting

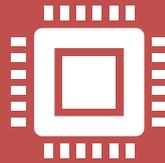
- *BREAK* -

Swap Shops

Textile Recycling

Resident Education

Compacting Construction & Demolition Debris (C&D)



Lancaster, NH: 2 ways
of handling incoming
C&D



Both options densify
the construction
debris to cut down on
haul fees to the landfill

1) Lancaster's Auger for C&D

- Used for furniture and large wood items
- Get crushed by a screw auger
- Average load weight is 9-10 tons





2) Open-Top Containers

- For material that is dumped on a concrete pad from dump trucks
- Then put into the open tops with a loader
- Average load weight 5.5 – 6 tons

“Pre-crusher” for C&D

- Littleton, NH has a “pre-crusher” compactor for C&D
- Cost \$50,000 and requires 3 phase power on site



C&D Disposal Fees

Lancaster charges \$20 per cubic yard for material brought in

Pays by the ton for material going out

Important to understand costs to landfill so disposal fees from residents/businesses cover those costs

Understanding Cost per Ton or Pound of C&D

\$10/ton savings by using Auger to crush/densify C&D

C&D Method	# TONS	TIPPING	TRANS	TOTAL	PER TON	PER LB
CRUSHER	8.24	\$581.99	\$262.35	\$ 844.34	\$102	\$0.05
OPEN TOP	5.95	\$404.12	\$262.35	\$ 666.47	\$112	\$0.06



Know your material

Final thought on C&D:

What comes into your facility that could be separated from C&D and handled less expensively or in a more environmentally sound way?

- Ex. Pallets – separated as clean wood, given away to residents
- Asphalt Shingles
- Reusable 2 x 4's or plywood



Composting Food Scraps





Leaf and Yard Waste

NH Bans Landfilling or Incinerating this Material

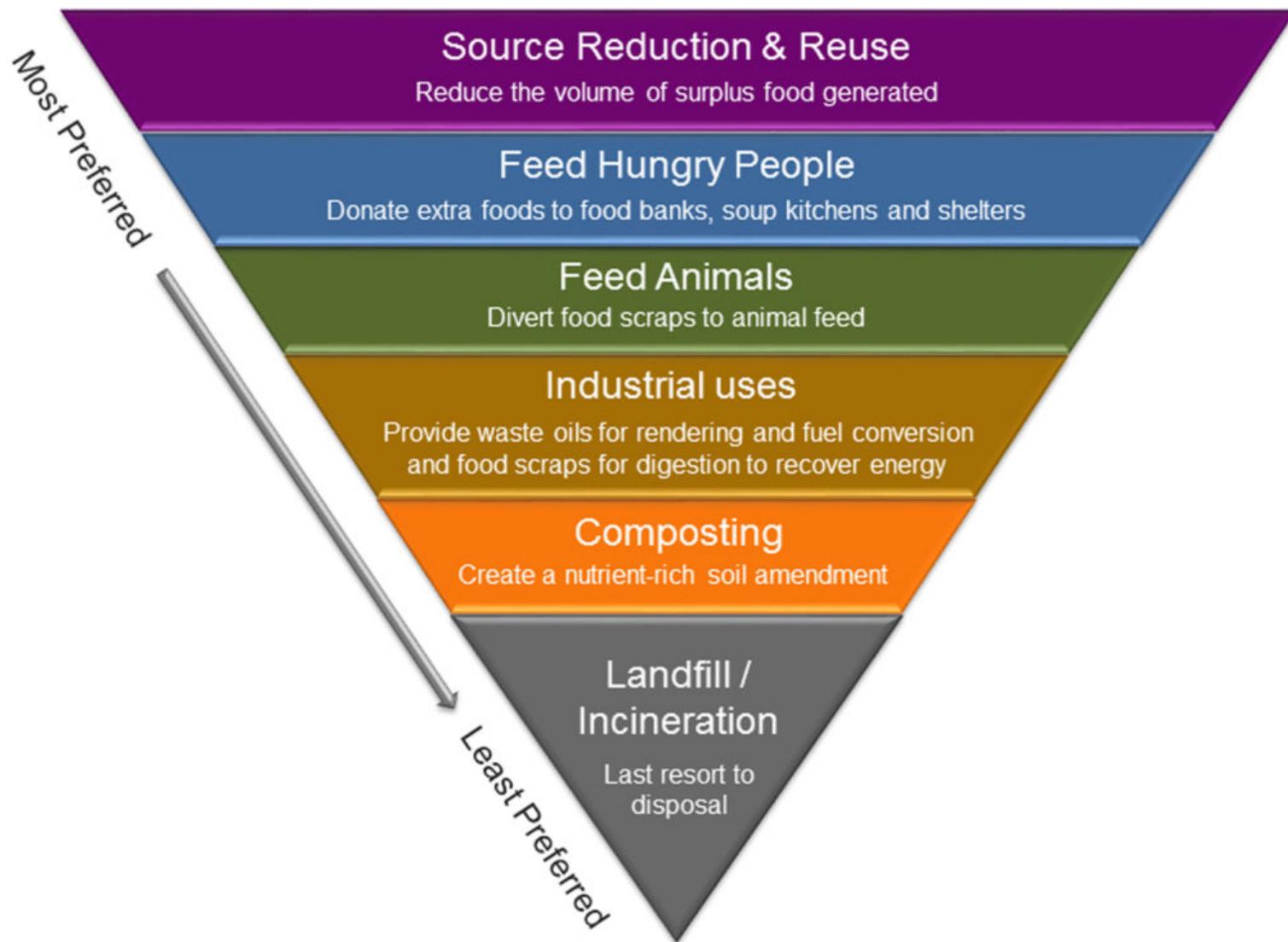
Food Scraps

- Food scraps are single largest component of material being landfilled (24%; EPA 2018)
- Only 4% of food scraps are composted in US (EPA 2018)
- Landfilling food scraps problematic for environmental, financial and moral reasons





Food Recovery Hierarchy



Limited Food Scraps Composting in NH – Why?



- 6 active food waste composting facilities in NH
- Only 2 compost meat and dairy
- Composting regulations need to be updated (in progress)
- Other states devote more resources for education, outreach, grant programs, and legislation

Composting Food Scraps in NH

- Without Meat & Dairy:
 - If have permit by notification, notify NHDES
- With Meat and Dairy:
 - Requires extensive permit process with NHDES
 - 2015 law directed NHDES to establish rules for composting meat and dairy
 - Not yet completed, but can request waiver of rules

Starting a Municipal Food Scrap Composting Program

1. Launch a backyard composting campaign
2. Check your permit & contact NHDES
3. Get educated - talk to someone who is already doing it, take a course
4. Identify your end markets for compost
5. Start small with a pilot project

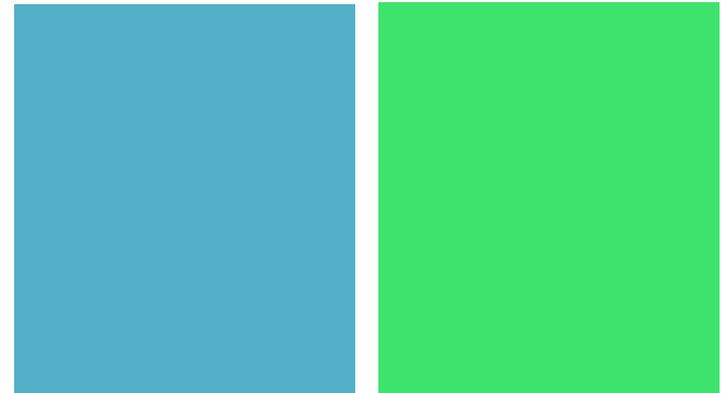


Got Compost? Hollis, NH

- Staff attended Maine Compost School
- Have permit by notification, so gave notice to NHDES
- Accept residential food scraps, no meat or dairy
- Fill three trash cans fully daily when open

Lebanon, NH – Getting Started

- Aggressive backyard composting campaign introduced concept to residents
- Pilot project in 2020, some participants notably reduced food scraps during pilot
- Estimated 20% of total disposal weight in Lebanon from food scraps
- Diverted 3,000 tons of food scraps in 2020



Lebanon, NH – Current Program

- Over 135 residents paid \$15 for annual permit
- Commercial accounts pay \$50 per ton
- Cost avoidance: \$75 per ton for MSW
- Compostable products must be BPI certified (no PFAS); scraps must be bagged
- Diverting 400 pounds monthly
- Lack of carbon (ex. leaves) limiting factor
- Compost used as daily cover and at cemeteries, parks, and athletic fields in Lebanon

Lee & Rye, NH – Commercial Service

- Option to use commercial service to pick up scraps
- Would need to update operating plan
- Mr. Fox accepts residential food scraps in seacoast, including meat and dairy, then composts in Maine
- Rye fills up four 50-gallon trash bins weekly, residents bag scraps



Composting Resources

- [Overview of Composting Laws & Regulations in NH](#) (NRRA Handout)
- [Food Waste Diversion](#) (NRRA Webinar)
- [Maine Compost School](#)



Pay as You Throw (PAYT)

- Residents pay for municipal solid waste (MSW) by purchasing one of the following:
 - Specially marked/colored or clear bags
 - Stickers/Tags
 - Punch Cards
- Fits all size communities



PAYT is a unit-based fee system

- Once PAYT is instituted, mandatory recycling no longer applies
- Similar to a utility bill, one who uses a great deal of electricity pays for this per kilowatt; one who conserves electricity pays less
- Likewise, one who throws away a great deal of trash pays per bag; the person who recycles pays less
- Both pay for what they use in this unit-based fee system

Benefits of PAYT

- Provides resident incentives to throw away less when trash metered like other utilities (ex. electricity, gas, water)
- Encourages residents to use valuable resources more responsibly and increase recycling and other waste diversion methods
- Reduces MSW generated, saving money for municipalities by reducing disposal costs



Criticisms of PAYT

- Concerns about illegal dumping
 - Identify sweet spot for bag price
 - Is cost enough to encourage reduction in waste?
 - But not so high to encourage illegal dumping

Small Community Example

- Shelburne, NH
- Population 372
- Drop-off, recently changed from single stream to source separated
- PAYT for MSW - Package of five bags is \$7.50



03.30.2015 10:08

Medium
Size
Community
Example

- Littleton, NH
- Population 5,928
- Drop-off, Source Separated Recycling Program
- 20 Gallon Bags - \$2 each (\$20/roll)
- 30 Gallon Bags - \$3 each (\$30/roll)

LITTLETON RECYCLES



444-1447

Do You?

Large Size Community Example

- Concord, NH
- Population 42,501
- Curbside and Drop-off, Single Stream
- Trash tonnage reduced by 40% since the PAYT Program began in July 2009

Ensuring Compliance – New London

- Give person one explanation of how to get sticker, allow them to dump that one time
- Then turn them away in future unless have a sticker
- Consistency and support from town administrator and town clerk essential

Ensuring Compliance - Lisbon

- If resident brings trash not using PAYT bag, staff charge them for a PAYT bag
- If large black construction debris bag, charge double or resident can weigh bag on scale



How to Get Started?

- Public education
- Decide on system want to use (ex. bags, tags)
- Decide on fee to be assessed
- Warrant article at town meeting

APPENDIX IX

Sample PAYT Warrant Articles

Example 1:

To see if the town will vote to authorize the Selectmen to establish and implement a mandatory "pay-as-you-throw" program and further to adopt the provisions of RSA 31:95-c for the purpose of accounting for the sale of solid waste bags and tags or other receipts as budgeted annually, to be used to pay the cost of collection and disposal of residential solid waste and sue other direct and indirect costs as budgeted annually. Such revenues and expenditures shall be accounted for in a special revenue fund to be known as the Pay-as-you-throw fund, separate from the general fund. Any surplus in said fund shall not be deemed part of the general fund accumulated surplus and shall be expended only after a vote by legislative body to appropriate a specific amount from said fund for a specific purpose related to the purpose of the fund or source of revenue.

Example 2:

To see if the Town will vote to raise and appropri-

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ate the total sum of \$25000.00 to implement curbside recycling on a weekly basis and authorize the selectmen to adopt the provisions of RSA 31:95-c for the purpose of accounting for the sale of designated solid waste bags and other receipts as budgeted annually, to be used to offset the cost of collection and disposal of residential solid waste. Such revenues and expenditures shall be accounted for in a special revenue fund known as the Tilton recycling revenue fund, separate from the general fund. Recyclables will be disposed of at no charge. Non-recyclable solid waste must be placed in approved bags. The first 50 bags per dwelling unit to be supplied at no charge, additional bags to be purchased at a nominal fee.

Example 3:

To see if the town will vote to authorize the board of Selectmen to establish and implement a mandatory "pay-as-you-throw" program and further to adopt the provision of RSA 31:95-c for the purpose of accounting for the sale of designated solid waste bags (and/or coupons and other receipts) as budgeted annually, to be used to offset the cost of collection and disposal of residential solid waste and such other direct costs as budgeted annually. Such revenues and expenditures shall be accounted for in a special revenue fund to be known as the Pay-as-you-throw fund, separate from the general fund. Any surplus in said fund shall not be deemed part of the general fund accumulated surplus and shall be expended only after a vote by the legislative body to appropriate a specific amount from said fund for a specific purpose related to the purpose of the fund or source of revenue. (Majority vote required)

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Pay As You Throw Resources

- [Pay as You Throw](#) (NRRA Info Sheet)
- [Plastic Bag Sources - Pay As You Throw](#) (NRRA Info Sheet)
- [Cutting Trash in Half: How New Hampshire Towns and Cities Can Secure Their Financial Future with Pay-as-You-Throw](#) (NH Municipal Association Article)



Full Cost Accounting

- Way to understand what is making or costing money
- Includes past and future expenses, overhead costs (ex. salary, benefits), and operating costs





Solid Waste Programs Context



- Understand true cost of solid waste programs
- Helpful for budgeting
- Helpful for education - select board and town meetings
- Informs changes that can be made to reduce costs and increase revenue

Myth Versus Truth

Myth: If recyclables can't be sold for a profit, then they should be thrown away

Truth: Recycling and other waste diversion methods can be a valuable cost avoidance strategy

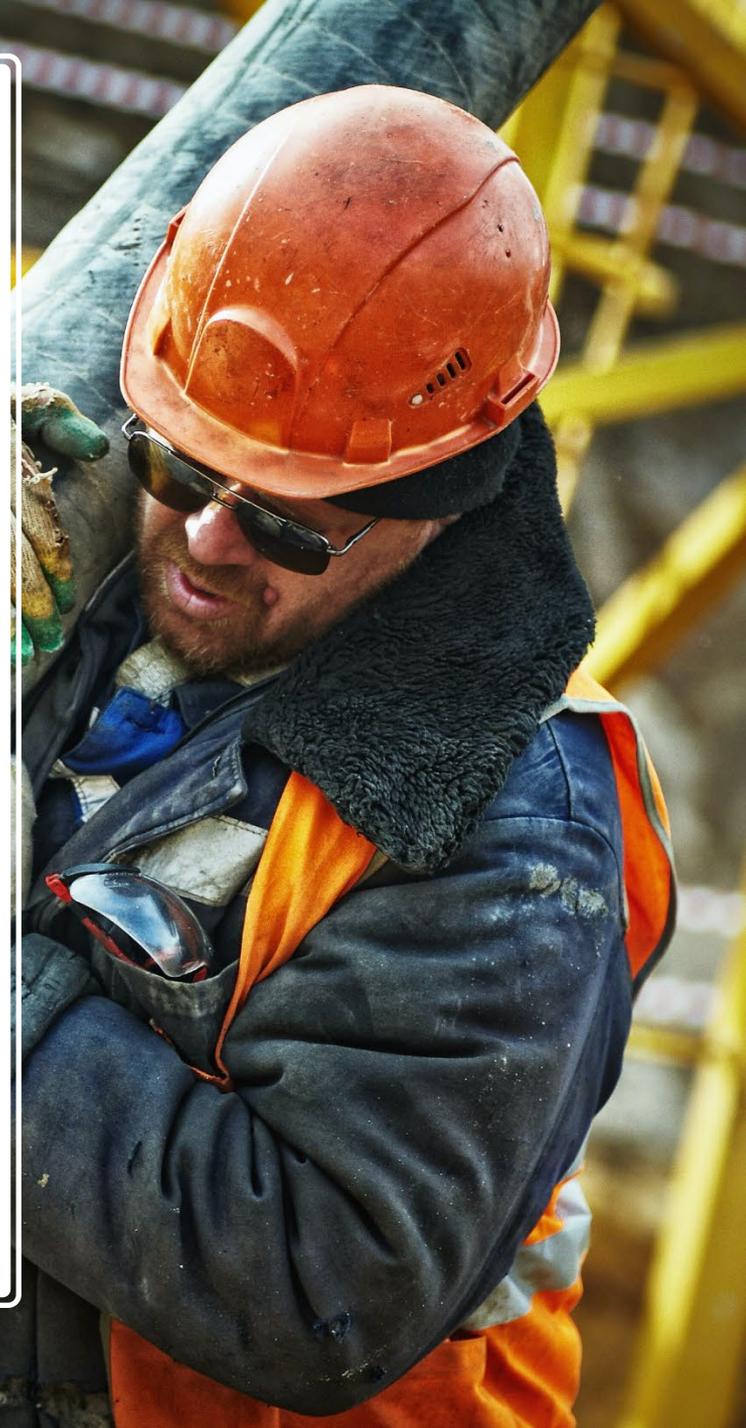
Value of Cost Avoidance

- Compare all revenue and expenses against avoided disposal cost
- Lowering expenses can be more impactful than increasing revenue!
- Ex. Paying \$40 per ton to recycle glass versus paying \$85 per ton to throw it away

Determine Disposal Costs

Tipping Fee + Transportation
Fee = Total Cost Per Ton

Example: \$75 per ton tip fee +
\$25 per ton transportation =
\$100 per ton cost of disposal



Determine Recycling Revenue or Cost

- Don't forget value from avoided cost
- Baled Cardboard Example:
 - \$80 per ton revenue
 - \$100 per ton avoided cost
 - Intrinsic value of \$180 per ton



Recycling – Fibers Key

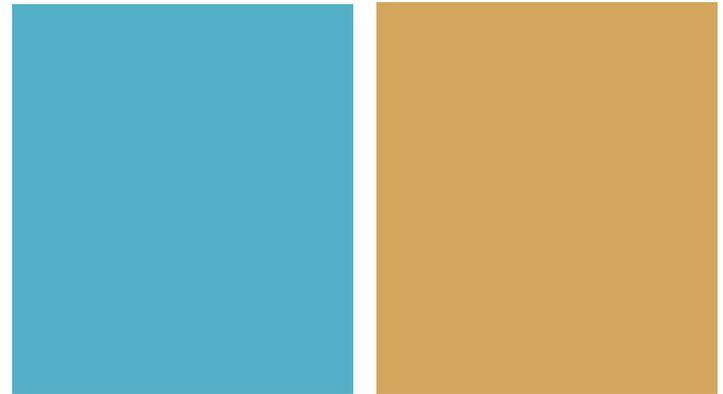
- If single or dual stream, easier to track revenue/cost and tonnages
- If source separated, individually track most common commodities your facility accepts
- Fibers (ex. cardboard, mixed paper) #1 most important to track
- Why? Over half of residential recycling by weight is fibers

Analyze Facility Fees

- Track fees collected from residents as revenue (ex. C&D, tires, trash if use PAYT)
- Compare to costs for each of those items
- Do your fees cover your costs?

Analyze Facility Fees - Example

- Gilford, NH C&D
- Data showed only 55% of their costs covered by fees
- Costing town nearly \$40k beyond fees
- Why? Hard for staff to estimate volume brought in
- Used data to get town approval to purchase truck scale



Track Monthly Expenses & Revenue



Monthly data can reveal trends



Determine how often ship out MSW, C&D, and recyclables



Add staffing costs (ex. salary, benefits)



Ex. Littleton, NH – February lowest revenue month each year



Ex. Gilford, NH – cardboard rises notably over summer months

Analyze & Adapt

- Review data and trends
- Identify how to slightly increase revenue and decrease expenses
- Use staff downtime productively
 - Ex. Littleton, NH: Staff pick out metal from C&D during downtime and recycle metal
 - Decreases their disposal cost while increasing revenue

Cost Avoidance Education

RECYCLING YEAR IN REVIEW

YEAR	WEIGHT	INCOME	AVOIDED COSTS	NOTES
PAPER				
GLASS				
TIN CANS				
ALUMINUM CANS				
PLASTIC				
SCRAP METAL				

NEW HAMPSHIRE *The Beautiful*



4'x8' YEAR IN REVIEW

Cost Accounting Resources

[Tricks of the Trade](#)
(NRRA Webinar)



Questions & Break



Swap Shops

To Swap or Not to Swap....

- Even prior to COVID-19, Swap Shops have always been a love them – dislike them entity
- Some communities put great effort into giving useable items one more chance
- Other communities fear liability issues and shy away from the concept

Benefits of Swap Shops

- Encourages reuse, rather than disposal, of gently used items
- Model of Yankee frugality
- Can be very popular among residents
- Some generate revenue by charging fee or taking donations



Milford, NH's "Still Good Shed"

Downsides of Swap Shops

- Requires staff or volunteer time
 - Keeping shop organized
 - Ensuring people don't add items that should be disposed instead
- Some frustrated when residents resell items
- Most closed during COVID-19
 - concerns about people in close quarters

Candia, NH's "Swap Shoppe"



Swap Shop Resources

April 14, 2021 NRRA [Member Operations Marketing Meeting](#)

- Special presentation about swap shops and liability concerns during pandemic
- Speaker from Primex

Textile Recycling

- Keeping textiles out of waste stream can be a challenge for many communities
- Most often, rely on local or national companies to provide containers
- Any fabric that is clean and dry is allowable in these containers and some companies offer revenue



Textile Recycling

- Textiles also find their way to local thrift stores
- Main goal is to keep textiles out of waste stream
- Collect clean & dry clothing, belts and shoes
- Items must be bagged

Have a Swap Shop?



- Do not collect clothing, belts or shoes in the swap shop
- Encourage residents to place in a designated and secure clothing bin

Amherst, NH

Textile Recycling Resources

- [Textile Recycling](#) (NRRA Info Sheet)
- [The Basics of Textile Recycling](#)
(Article)



Resident Education

- Many creative ways to educate and engage your residents – can be overwhelming
- Will focus on some examples, from easiest to more time-consuming



Littleton, NH

Be Nice to People!

- Feed the dogs
- Talk with residents
- Joke around
- Help residents

Why Be Nice?

Per Former Littleton Solid Waste Manager:

- “We have never had anything voted down.. Usually one of highest % yes items
- People respect you...less likely to screw you
- They enjoy going there...want to show off to friends/family...get donations, treats...
- Not Afraid to Ask Questions...Knowledge is key”



Lee, NH

Revenue and cost signs

IN THIS COMMUNITY RECYCLING IS MANDATORY

NEW HAMPSHIRE *The Beautiful*



MSW-LANDFILL

\$67.00 A TON

COST

MARKET DIRECTION

STABLE TILL JAN 1

2021

TO
TRAN
E

ARTICLE

TV'S/MONITOR
TV'S/MONITOR

TIRES 14" OR I
TIRES 15" OR I
TRUCK TIRES
EQUIPMENT TI

ALL MATTRES
OVERSTUFFED
ALL SOFAS

FRIDGE/FREEZ
AC/ DEVICES
ELECTRONICS
(MICROWAVES)

CONSTRUCTI
51-100LBS
PER TON

PROPANE TAN
PROPANE TAN
PROPANE TAN

*CASH

*DEF

Hollis, NH



Clear signage



Posters for resident education



Creative ways to advertise services



Simple techniques to share information



Recyclables – Clear Signage & Examples

**EFFECTIVE FROM
NOW ON**

NO CAPS CLEAR BOTTLES THAT ARE SIMILAR TO THESE SAMPLES ONLY

**ALL OTHER PLASTICS
HAS TO BE THROWN IN TRASH
NO EXCEPTIONS**

**CLEAR PLASTIC
BOTTLES ONLY NO
CAPS**

of
Hollis Transfer
Station

Bottles Only
Why?



Hollis Transfer Station



Heading to Keene

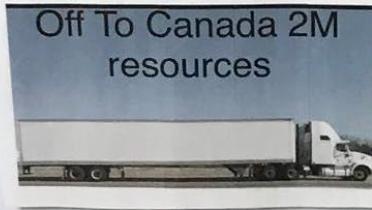


Dumped at

The Keene Facility



At The 2M Facility



Off To Canada 2M
resources



Meets Inspection

Where does my recycling go?



Glass melted



can be spun into thread from spinners
like cotton candy is spun out of
a drum.

Glass Is Washed



Fun with
advertising





Transparency

Gilford, NH – Recycle Right Campaign



Social media



Flyers & Signage
(ex. sandwich
boards)



Public
presentations (ex.
at local library)

“Recycling Right Brings in Revenue”



   You and 87 others

3 Comments 14 Shares

Recycle Right Campaign Benefits

As cited by Gilford
Public Works Director:

- Educating residents
- Making residents feel good about recycling
- Making town recycling staff feel good through recognition of their efforts
- Showing the town select board that recycling makes the community money

Lebanon, NH

Social Campaign Focused on Reuse



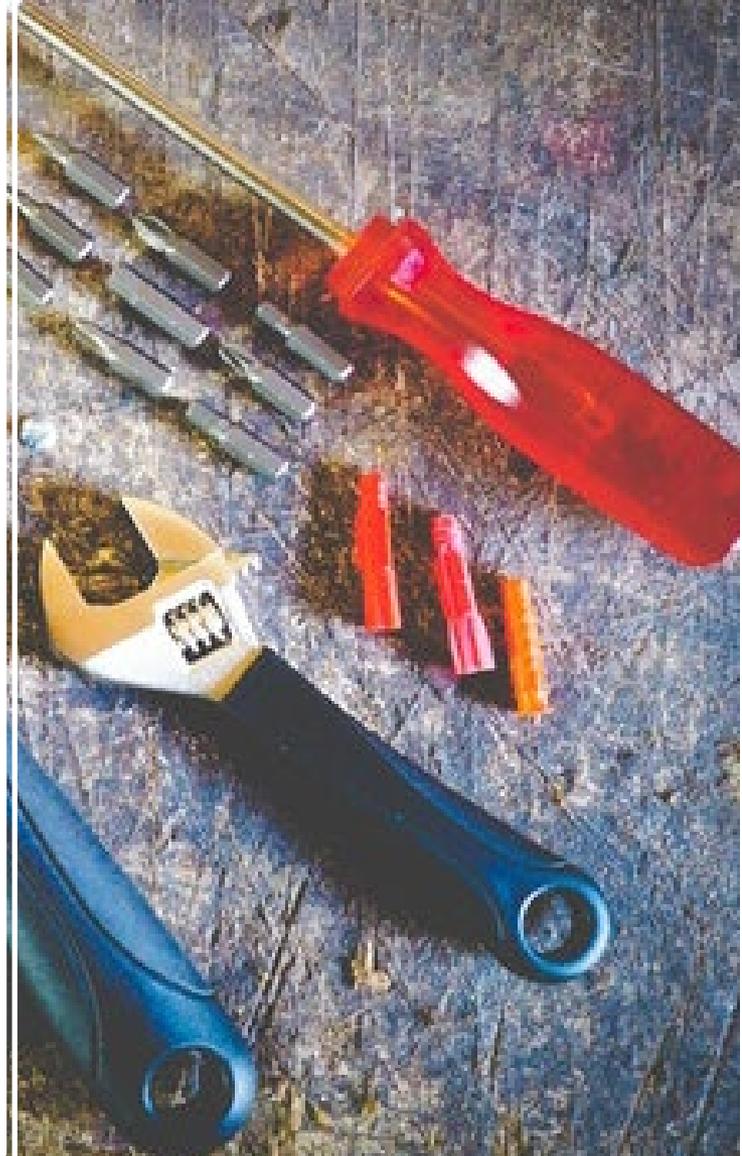
Campaign for Month of April

- Partnership between Lebanon & Coop Food Stores
- Residents Took Pledge:
 - To use a reusable coffee mug
 - To use a reusable water bottle
 - To use reusable grocery bags
 - To bring lunch from home



Participant Engagement

- Awarded prizes weekly to a selected pledge participant
- Programs included:
 - Community conversation events
 - Repair café
 - Green shopping initiative workshops
 - Reusable coffee cup program



Resident Education Resources

- [Educate, Don't Contaminate!
A Toolkit to Clean up Recycling](#)
(NRRA Webinar)
- [Refill Not Landfill](#) (NRRA
Webinar)
- [Optimizing Our Recycling
Education and Outreach
Efforts](#) (NRRA Webinar)
- [Tricks of the Trade](#) (NRRA
Webinar)



Group Discussion

Let's Take a Poll

1. Which of the waste reduction strategies does your community use?
 - If something is temporarily on hold due to COVID, include in the strategies you use
2. Which waste reduction strategies does your community not use that you'd like to consider implementing?

Discussion Questions

For each of the waste diversion strategies:

1. What are challenges you've faced?
2. What would be the first step to implement this strategy? What barriers might you face?

Want to Learn More?

The screenshot shows the top navigation bar of the NRRA website. The logo on the left reads "NORTHEAST RESOURCE RECOVERY ASSOCIATION". The navigation menu includes "MY ACCOUNT", "LOG OUT", a Facebook icon, "SUBSCRIBE TO E-NEWS", and "DONATE". Below the navigation bar, the main menu features "About NRRA", "Resource Library", "Member Programs & Services", "School Recycling Club", and "News & Events". The main content area displays a large photograph of an outdoor meeting at a recycling facility. A text overlay on the photo reads: "Blue Skies Over Gilford, NH for Monthly MOM Meeting and Tour Blue skies and a brand new recycling facility attracted NRRA members from near and far to attend the October 14th outdoor meeting. We were all eager to hear about what sparked Gilford to build this \$1.4 million recycling center complete with horizontal baler and floor scale and what advice they...". A "Read More" button is positioned below the text. At the bottom of the photo are three small white circles.

Members

Educators & Students

Vendors

Member Price Lists

Load Request Form



 **Northeast Resource Recovery Association**

Virtual Conference May 10 & 11
8 AM to Noon
FREE for Members

- Engaging Residents with Municipal Recycling
- Waste Reduction Strategies – Reduce, Reuse, Rot
- Recycling Safely During COVID-19
- National & Local Recycling Markets & Market Specifications
- Plastics with a Plan: Municipal Options
- Understanding End Markets – What Happens with Your Recycling?



June 2, 2021
9 AM to 12 PM
NHDES

Understanding Recycling Markets & Practical Tips

Questions & Thank You



Northeast Resource Recovery Association

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STAY CONNECTED

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