



# Manistee County Board of Commissioners

Manistee County Courthouse • 415 Third Street • Manistee, Michigan 49660

CHAIRPERSON  
Jeffrey Dontz  
VICE-CHAIRPERSON  
Karen Goodman

Margaret Batzer  
Mark Bergstrom  
Pauline Jaquish  
Gene Lagerquist  
Richard Schmidt

CLERK

Jill Nowak  
(231) 723-3331

CONTROLLER/ADMINISTRATOR

David A. Kieft, Jr.  
(231) 398-3504

## GREEN TEAM/RECYCLING COMMITTEE MINUTES

Thursday, February 27, 2020  
8:30 a.m.

Manistee County Courthouse & Government Center  
Board of Commissioners Meeting Room

### MINUTES

Members Present: Gene Lagerquist and Margaret Batzer, Chairperson

Members Absent: Mark Bergstrom

Others Present: Sarah Archer, Iris Waste Diversion Specialists; Bruce Schimke, Maintenance Supervisor; David Kieft, Jr., County Administrator/Controller; Julie Schmeling, Administrative Secretary; Jill M. Nowak, County Clerk

The meeting was called to Order at 8:30 a.m.

**NOTE – Items requiring Board Action are indicated in BOLD**

### P.A. 69 RECYCLING UPDATE

Sarah Archer, Iris Waste Diversion Specialists, presented the Manistee County Green Team Recycling Program Report of February 26, 2020. (Appendix A) Ms. Archer noted that data is now up to date and January 2020 shows a slightly higher volume was recycled.

Ms. Archer reported there are a few grant projects being worked on. For EGLE 2020 Scrap Tire Collection Grant, the first scrap tire collection event is set for June 6, 2020 at Bay Area Recycling Center (BARC) and the second scrap tire event is set for September 26, 2020, which will hopefully be at the County Fairgrounds in Onekama. Mr. Kieft will send Ms. Archer a Project Application. The Grant Agreement has already been approved. The second Grant from EGLE 2020 Recycling Quality Improvement Grant is a new grant for improving materials received at recycling drop off sites. The funds available are \$3.00 per household and there is no match required. This application is due on Friday, February 28, 2020. The third grant being worked on is the EGLE 2020 Electronic Waste Mini Grant. This grant is available for \$10,000 per location and the match can be in-kind staff time. This would establish a permanent site to be open to the public no less than four (4) hours one day per month to collect electronics. There

may be a small fee per electronic involved. Sustainability is important for the program, BARC may be interested in working cooperatively with this program as is Networks Northwest.

**RESOLUTION #2020-5 RESOLUTION OF SUPPORT FOR  
SOLID WASTE PLANNING AMENDMENTS**

Ms. Archer presented to the Committee a Resolution (Appendix B) entitled Manistee County Resolution of Support for Solid Waste Planning Amendments. This Resolution supports Part 115 Solid Waste Planning Amendments. This Resolution supports updating of Michigan's Solid Waste Statutes to prioritize sustainable materials management. Manistee County would receive funding to update the Manistee County Solid Waste Plan that was approved in 1999. This draft Resolution was provided at the February Networks Northwest meeting and was discussed at the January Green Team meeting and is now recommended for review.

**Moved by Lagerquist, seconded by Batzer to recommend the approval of Resolution #2020-5 Manistee County Resolution of Support for Solid Waste Planning Amendments. Ayes: All. Motion Carried.**

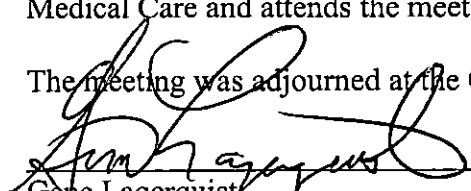
**OTHER ITEMS FROM COMMITTEE MEMBERS**

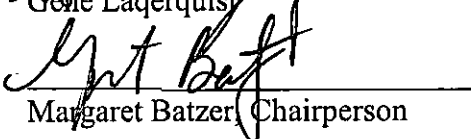
Bruce Schimke inquired if contact was made with the company that recycles electronics for \$50 per load. Mr. Schimke will check into this and let Ms. Archer know.

Commissioner Lagerquist met with Republic Services and others regarding recycling collection, processing, residual and sales. Mr. Lagerquist distributed a handout (Appendix C) which refers to global information; and while Republic is a national company, we keep our trash locally in Traverse City. Non-profit vs for profit are very different.

Mr. Lagerquist also distributed information (Appendix D) from Allan O'Shea regarding utility savings and annual performance of solar. It is noted that the electric bills for the Medical Care Facility, jail and 911 are \$148,000 annually. The information indicates that the purchase of electric energy from a utility is expected to be reduced by 55%. It would take 12 years to pay for itself with a life expectancy of 25-30 years, including inflationary costs. The Committee wasn't very sure if these would be accurate costs for government buildings that are open 24/7. Discussion regarding geo-thermal and if that would be a better option. Mr. Schimke indicated that valves are all electronic at the jail and therefore money could only be saved on the jail area of the building. Contact should be made with Medical Care Board members to encourage utility savings and to explore options that are available. Commissioner Jaquish is the liaison with the Medical Care and attends the meetings.

The meeting was adjourned at the Call of the Chair at 9:15 a.m.

  
Gene Lagerquist

  
Margaret Batzer, Chairperson

ABSENT  
\_\_\_\_\_  
Mark Bergstrom

**Manistee County Green Team  
 Recycling Program Report – February 26, 2020  
 Sarah Archer, Iris Waste Diversion Specialists, Inc.**

**APPENDIX A**

The following is a summary of Recycling Program activity since January 28, 2020

Meeting Attendance

- Green Team – January 30, 2020
- Household Hazardous Waste Coordinating Committee – February 4, 2020
- Networks Northwest Materials Management Advisory Committee – February 21, 2020

Current Volume Report

Total weight (pounds) of materials collected from 6 recycling drop-off sites.

January	34,840	April		July		October	
February		May		August		November	
March		June		September		December	
						Total To-Date	34,840

- There was a 1% increase in volume for January 2020 compared to January 2019.
- Total program costs through January are \$160.04 higher than in 2019.

Education

- Monthly e-newsletter sent.

Grant Projects

- **EGLE 2020 SCRAP TIRE COLLECTION GRANT**
  - Dates – Saturdays, June 6 and September 26, 2020
    - June 6 – Bay Area Recycling for Charities (BARC), Kaleva
    - September 26 – request to be made for use of Manistee County Fairgrounds
- **EGLE 2020 RECYCLING QUALITY IMPROVEMENT GRANT**
  - New grant opportunity for improving materials captured at recycling drop-off sites
  - Reimbursement grant; funding available up to \$3.00 per household; NO match required
  - Deadline 3:00 p.m., Friday, February 28, 2020
    - On-line application submission in process
- **EGLE 2020 ELECTRONIC WASTE MINI-GRANT**
  - \$10,000 per location – match can be in-kind, staff time
  - Last year of mini-grants to establish permanent electronics drop-off locations across the region. Permanent sites must be open to the public no less than 4 hours of one day each month.
  - Grant funding would cover the costs of setting up a drop-off location including a storage building, containers, signage, etc. EGLE will consider a location where a drop-off occurs each month as a “permanent” site, eliminating the need for a permanent structural location.
  - The grant also covers processing costs for CRT/LED/LCD monitors and TVs.
  - Networks Northwest Materials Management Advisory Committee will convene in March to discuss a regional collection strategy with BARC for those counties interested in applying.

Other

- A draft county resolution to support Part 115 Solid Waste Planning amendments was provided at the February Networks Northwest meeting. Language from this draft has been incorporated into the draft discussed at the January Green Team meeting and is provided for review.
- Attached Michigan Recycling Coalition Part 115 Changes Summary, “Support Reforms to Michigan’s Waste and Recycling Law” January 23, 2020

A-2

JANUARY	LBS	% Change from Previous Month
Arcadia Twp	7,480.0	13%
Brown Twp	4,176.0	19%
Cleon Twp	2,873.0	166%
Maple Grove Twp	5,759.0	18%
Onekama Twp	11,420.0	1%
Springdale Twp	3,132.0	33%
<b>JANUARY TOTALS</b>	<b>34,840.0</b>	<b>17%</b>
<b>FEBRUARY</b>		
Arcadia Twp	0.0	
Brown Twp	0.0	
Cleon Twp	0.0	
Maple Grove Twp	0.0	
Onekama Twp	0.0	
Springdale Twp	0.0	
<b>FEBRUARY TOTALS</b>	<b>0.0</b>	
<b>MARCH</b>		
Arcadia Twp	0.0	
Brown Twp	0.0	
Cleon Twp	0.0	
Maple Grove Twp	0.0	
Onekama Twp	0.0	
Springdale Twp	0.0	
<b>MARCH TOTALS</b>	<b>0.0</b>	
<b>APRIL</b>		
Arcadia Twp	0.0	
Brown Twp	0.0	
Cleon Twp	0.0	
Maple Grove Twp	0.0	
Onekama Twp	0.0	
Springdale Twp	0.0	
<b>APRIL TOTALS</b>	<b>0.0</b>	
<b>MAY</b>		
Arcadia Twp	0.0	
Brown Twp	0.0	
Cleon Twp	0.0	
Maple Grove Twp	0.0	
Onekama Twp	0.0	
Springdale Twp	0.0	
<b>MAY TOTALS</b>	<b>0.0</b>	
<b>JUNE</b>		
Arcadia Twp	0.0	
Brown Twp	0.0	
Cleon Twp	0.0	
Maple Grove Twp	0.0	
Onekama Twp	0.0	
Springdale Twp	0.0	
<b>JUNE TOTALS</b>	<b>0.0</b>	

JULY	LBS	% Change from Previous Month
Arcadia Twp	0.0	
Brown Twp	0.0	
Cleon Twp	0.0	
Maple Grove Twp	0.0	
Onekama Twp	0.0	
Springdale Twp	0.0	
<b>JULY TOTAL</b>	<b>0.0</b>	
<b>AUGUST</b>		
Arcadia Twp	0.0	
Brown Twp	0.0	
Cleon Twp	0.0	
Maple Grove Twp	0.0	
Onekama Twp	0.0	
Springdale Twp	0.0	
<b>AUGUST TOTAL</b>	<b>0.0</b>	
<b>SEPTEMBER</b>		
Arcadia Twp	0.0	
Brown Twp	0.0	
Cleon Twp	0.0	
Maple Grove Twp	0.0	
Onekama Twp	0.0	
Springdale Twp	0.0	
<b>SEPTEMBER TOTAL</b>	<b>0.0</b>	
<b>OCTOBER</b>		
Arcadia Twp	0.0	
Brown Twp	0.0	
Cleon Twp	0.0	
Maple Grove Twp	0.0	
Onekama Twp	0.0	
Springdale Twp	0.0	
<b>OCTOBER TOTAL</b>	<b>0.0</b>	
<b>NOVEMBER</b>		
Arcadia Twp	0.0	
Brown Twp	0.0	
Cleon Twp	0.0	
Maple Grove Twp	0.0	
Onekama Twp	0.0	
Springdale Twp	0.0	
<b>NOVEMBER TOTAL</b>	<b>0.0</b>	
<b>DECEMBER</b>		
Arcadia Twp	0.0	
Brown Twp	0.0	
Cleon Twp	0.0	
Maple Grove Twp	0.0	
Onekama Twp	0.0	
Springdale Twp	0.0	
<b>DECEMBER TOTAL</b>	<b>0.0</b>	

<b>YEAR TO DATE (in lbs.)</b>	<b>34,840.0</b>
<b>YEAR TO DATE (tons)</b>	<b>17.4</b>

Year to date comparison by site

Totals in pounds	Jan-19	Jan-20
Arcadia Twp	8,537.0	7,480.0
Brown Twp	4,063.0	4,176.0
Cleon Twp	1,191.0	2,873.0
Maple Grove Twp	4,597.0	5,759.0
Onekama Twp	13,346.0	11,420.0
Springdale Twp	2,845.0	3,132.0
Unassigned Extra Service	N/A	N/A
<b>Totals in pounds</b>	<b>34,579</b>	<b>34,840</b>

Totals in tons	Jan-19	Jan-20
Arcadia Twp	4.3	3.7
Brown Twp	2.0	2.1
Cleon Twp	0.6	1.4
Maple Grove Twp	2.3	2.9
Onekama Twp	6.7	5.7
Springdale Twp	1.4	1.6
Unassigned Extra Service	N/A	N/A
<b>Totals in Tons</b>	<b>17.3</b>	<b>17.4</b>

## Support Reforms to Michigan's Waste and Recycling Law

January 23, 2020

It is widely-agreed that our state's solid waste law is in need of significant reforms. While the Legislature recently provided funding for recycling and solid waste management through the 2018 Renew Michigan measure, these funds cannot be effectively used without updating our law (Part 115 of the Natural Resources and Environmental Protection Act), which is now more than twenty-five years old. Under our current outdated policy, Michigan has only prioritized the development of disposal capacity, specifically the siting of new and expanded landfills. Further, Michigan's eighty-three counties are largely operating under solid waste plans that are now decades old. This has led to an oversupply of disposal capacity, the continued importation of out-of-state waste, and a dismal statewide recycling rate.

However, since that time we've learned that much of our waste can be managed in more valuable and sustainable ways – through waste reduction, diversion, reuse, recycling, and more. Businesses of all shapes and sizes, as well as governments and nonprofit organizations, have all recognized sustainable materials management as a shared priority. Governors of both parties have made a commitment to increasing Michigan's recycling performance.

To achieve this goal, Michigan must bring its waste and recycling policies up to date. This means providing resources for counties to modernize and implement their material management plans. County planning assures that communities across Michigan are engaged and actively managing the waste generated in their jurisdiction for productive use and environmental protection. Michiganders spend more than \$1 *billion* annually to manage their wastes. While the \$15M now available from Renew Michigan - funding grants for recycling infrastructure, market development, and education - is a significant investment, our State must also adopt policies to fully leverage this funding.

For well over three years, business, government, and conservation stakeholders have worked thoroughly to develop legislation that substantially updates Michigan's solid waste law with these goals in mind. Proposed changes refocus the law to promote the development of 21<sup>st</sup> Century recycling infrastructure and needs. Plans for funding and policy changes developed in tandem and were founded on the need to expand create a robust planning process that will consider not only disposal, but also materials management solutions like waste reduction, recycling, composting, and anaerobic digestion.

This comprehensive update of our solid waste law will:

- ✓ Provide a policy framework supporting investment in productive materials management as an economic driver
- ✓ Update and broaden the county planning process to encourage sustainable materials management
- ✓ Ensure adequate local capacity for managing materials
- ✓ Prioritize local control of facility siting and regulation of landfill development
- ✓ Provide state oversight of composting and recycling facilities
- ✓ Require adequate financial assurance for all permitted facilities, including landfills
- ✓ Allow for the development of new recycling technologies and facilities
- ✓ Establish benchmark standards to ensure access to recycling opportunities across the state
- ✓ Specify local funding mechanisms that can be used to support materials management
- ✓ Preserve the ability to flow material to publicly-managed facilities
- ✓ Eliminate import/export authorizations for disposal
- ✓ Support business commitments to a circular economy

Without a new materials management planning framework, the state will continue to squander its resources by incentivizing disposal and waste as an afterthought. It's time to invest in the economic opportunities inherent in the materials already circulating in the economy. Our groups agree this is the right way forward to Michigan and support these much-needed reforms.

**Manistee County Resolution of Support  
for  
Solid Waste Planning Amendments**

**Whereas**, the Michigan Department of Environment, Great Lakes, and Energy has been working with a wide range of stakeholders to substantially update and amend Part 115, Michigan's solid waste statute, to prioritize sustainable materials management, specifically the recovery and diversion of discarded materials for productive use;

**Whereas**, Manistee County's last Solid Waste Plan was approved in 1999 and is long overdue for an update. Manistee County would receive funding to facilitate a new planning process, in which all pertinent local stakeholders would work to update the county's plan under the updated system. Plans will be required to show how progress will be made to meet established benchmark recycling standards and State recycling goals based on the needs and interests of the county as determined by local participants. These new plans will be designated as Materials Management Plans, reflecting the shift in priorities to reduce disposal of resources;

**Whereas**, Part 115 updates aim to support sustainable materials management methodologies such as recycling, composting, anaerobic digestion, and other beneficial utilization activities, by:

- Incentivizing counties to set recycling goals and plan for holistic discards management.
- Consider and plan for the development of facilities necessary to manage these materials in ways that protect humans and the environment, as well, as making materials available for remanufacturing.
- Making funding available with the goal of tripling Michigan's recycling rate. The funding would cover:
  - County Materials Management Planning,
  - Recycling Infrastructure development,
  - Development of markets for recyclable materials, and
  - Education to help residents use recycling systems effectively.

**Whereas**, Manistee County recycles less than 10% of its municipal waste stream and would benefit from a new mindset on waste, funded planning, and state grants, including funding for:

- Improved recycling infrastructure and services
- Public education
- Economic development

**Whereas**, Public Act 588 enrolled in 2018 Legislation makes annual funding available to support the amendments proposed to Michigan Solid Waste Laws;

**Accordingly**, it is hereby resolved that the County of Manistee supports the substantial update of Michigan solid waste laws, Part 115, for the advancement of local, county, regional, and state recycling goals and county materials management planning.

Adopted by the County of Manistee on this day, \_\_\_\_\_

Signed:

\_\_\_\_\_  
Chairman of the Manistee County Board of Commissioners

Certification

STATE OF MICHIGAN        )  
COUNTY OF MANISTEE     )

I, \_\_\_\_\_, Clerk of the County of Manistee, Michigan, do hereby certify that the above resolution was duly adopted by the Manistee County Board of Commissioners on the \_\_\_\_\_ day of \_\_\_\_\_, 2020

In TESTIMONY WHEREOF, I hereunto set my hand and affix the Seal of the County of Manistee, Michigan this \_\_\_\_\_ of \_\_\_\_\_, 2020.

\_\_\_\_\_  
County Clerk



# Manistee County Board of Commissioners

Manistee County Courthouse • 415 Third Street • Manistee, Michigan 49660

Appendix B

CHAIRPERSON  
Jeffrey Dontz  
VICE-CHAIRPERSON  
Karen Goodman

Margaret Butzer  
Mark Bergstrom  
Pauline Jaquish  
Gene Lagerquist  
Richard Schmidt

CLERK  
Jill Nowak  
(231) 723-3331  
CONTROLLER/ADMINISTRATOR  
David A. Kieft, Jr.  
(231) 398-3504

## Resolution #2020-5

### Manistee County Resolution of Support for Solid Waste Planning Amendments

At a regular meeting of the Manistee County Board of Commissioners held in the Manistee County Courthouse & Government Center, 415 Third Street, Manistee, Michigan, on the 17<sup>TH</sup> Day of March, 2020.

PRESENT:

ABSENT:

The following resolution was offered by \_\_\_\_\_ and seconded by \_\_\_\_\_:

**Whereas, the Michigan Department of Environment, Great Lakes, and Energy has been working with a wide range of stakeholders to substantially update and amend Part 115, Michigan's solid waste statute, to prioritize sustainable materials management, specifically the recovery and diversion of discarded materials for productive use;**

**Whereas, Manistee County's last Solid Waste Plan was approved in 1999 and is long overdue for an update. Manistee County would receive funding to facilitate a new planning process, in which all pertinent local stakeholders would work to update the county's plan under the updated system. Plans will be required to show how progress will be made to meet established benchmark recycling standards and State recycling goals based on the needs and interests of the county as determined by local participants. These new plans will be designated as Materials Management Plans, reflecting the shift in priorities to reduce disposal of resources;**

**Whereas, Part 115 updates aim to support sustainable materials management methodologies such as recycling, composting, anaerobic digestion, and other beneficial utilization activities, by:**

- Incentivizing counties to set recycling goals and plan for holistic discards management.
- Consider and plan for the development of facilities necessary to manage these materials in ways that protect humans and the environment, as well, as making materials available for remanufacturing.



- Making funding available with the goal of tripling Michigan's recycling rate. The funding would cover:
  - County Materials Management Planning,
  - Recycling infrastructure development,
  - Development of markets for recyclable materials, and
  - Education to help residents use recycling systems effectively.

Whereas, Manistee County recycles less than 10% of its municipal waste stream and would benefit from a new mindset on waste, funded planning, and state grants, including funding for:

- Improved recycling infrastructure and services
- Public education
- Economic development

Whereas, Public Act 588 enrolled in 2018 Legislation makes annual funding available to support the amendments proposed to Michigan Solid Waste Laws;

Accordingly, it is hereby resolved that the County of Manistee supports the substantial update of Michigan solid waste laws, Part 115, for the advancement of local, county, regional, and state recycling goals and county materials management planning.

I, Jill M. Nowak, County Clerk, do hereby certify that the foregoing is a true copy of a Resolution adopted by the Manistee County Board of Commissioners at a regular meeting held on the 17<sup>TH</sup> Day of March, 2020, by the following vote:

YEAS:

NAYS:

NOT VOTING:

I further certify that the foregoing Resolution is a true, correct and complete transcript of the original of said Resolution appearing on file and of record in my office. I further certify that the meeting was held and the minutes therefore were filed in compliance with Act No. 267 of the Public Acts of 1976.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the Seal of the County of Manistee this 17<sup>TH</sup> Day of March, 2020.

CLERK OF THE COUNTY COMMISSION  
MANISTEE COUNTY, MICHIGAN

---

Jill M. Nowak, County Clerk

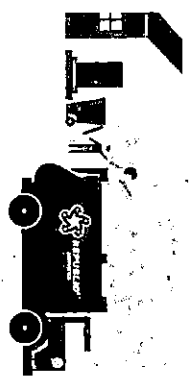
# Recommended Business Model

## Republic Services

## Cities & Municipalities

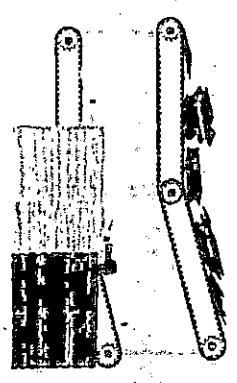
### COLLECTION

Includes costs for truck, driver, container and to collect material and transport to a processing facility  
Comparable to trash collection



### PROCESSING

Includes costly facility, equipment and labor to separate material and remove contamination  
Results in ready-to-ship baled material



### RESIDUAL

Includes all contaminated or non-recyclable material, which has no marketability and must be transported and disposed at a landfill for additional cost



### COMMODITY SALES


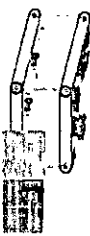


Sale of processed material to buyers around the world  
Cleaner material has greater value



\$

The cost of a recycling program is the sum of fees for two services:  
the **Collection Fee** and the **Net Processing Fee**

# Recycling Program Economics Over Time

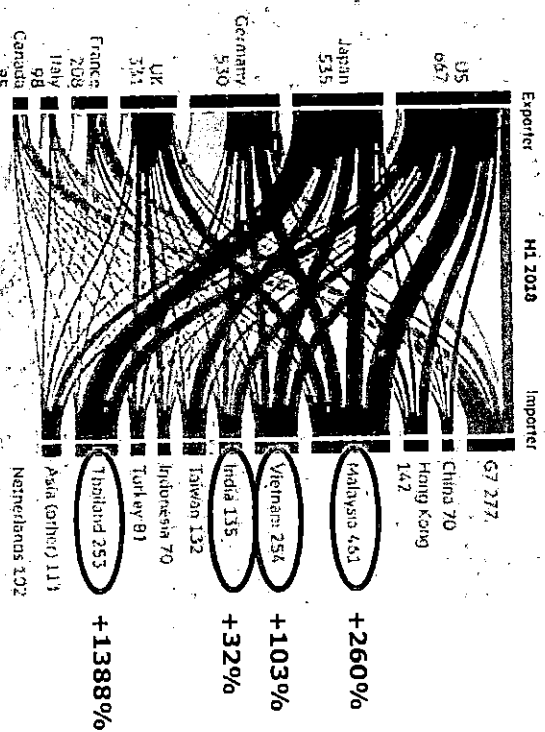
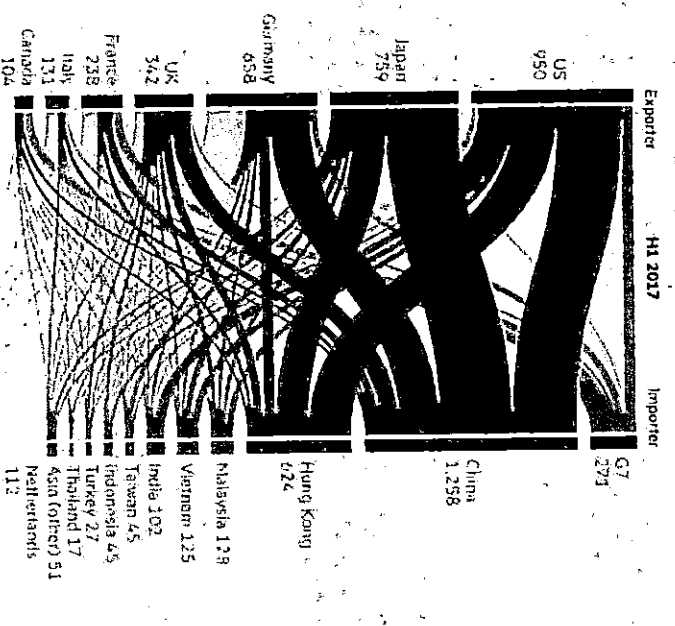
	 Collection	 Processing	 Commodity	 Residual	
<b>1990s</b>	Household cost artificially low to foster adoption	Costs lower due to inbound material being cleaner and heavier	Commodity values strong, due to Supply & Demand and cleaner material	Low contamination averages, attributed to focus on basics and no diversion mandates	
Industry Avg	\$2.00/Mo	\$60/Ton	\$200/Ton	\$25/Ton	
Net Position	+	+	+	+	\$0
<b>2018</b>	Still artificially low but with higher costs to run collection service	Dramatically higher costs from labor, technology and equipment, along with lighter material	Average values down significantly, further impacted by China Sword	Contamination average up to 30%, requiring more transport and disposal	
Industry Avg	\$3.00/Mo	\$100/Ton	\$100/Ton	\$50/Ton	
Net Position	+	+	+	+	\$5
<b>2019</b>	No change to increased costs	Continued cost escalation from labor, technology and equipment	Further value decline due to saturated markets	Public Education offers opportunity, but no change yet	
Industry Avg	\$3.00/Mo	\$120/Ton	\$70/Ton	\$50/Ton	
Net Position	+	+	+	+	\$6

China Sword exposed a \$5.50/month average gap in 2018. With further market and value declines, that gap is now **\$6.25/month** on average.

# Commodity Displacement

How the global river of plastic waste changed course in just 12 months

Exports of plastic waste, parings and scrap from G7 countries ('000 tonnes)



Following a Chinese crackdown on imports of plastic waste, which came into effect at the beginning of 2018, exports from the G7 fell by more than 20 per cent overall. The share of the remaining exports that went to China and Hong Kong fell below 10 per cent, with other Asian countries - particularly Malaysia - making up much of the shortfall.

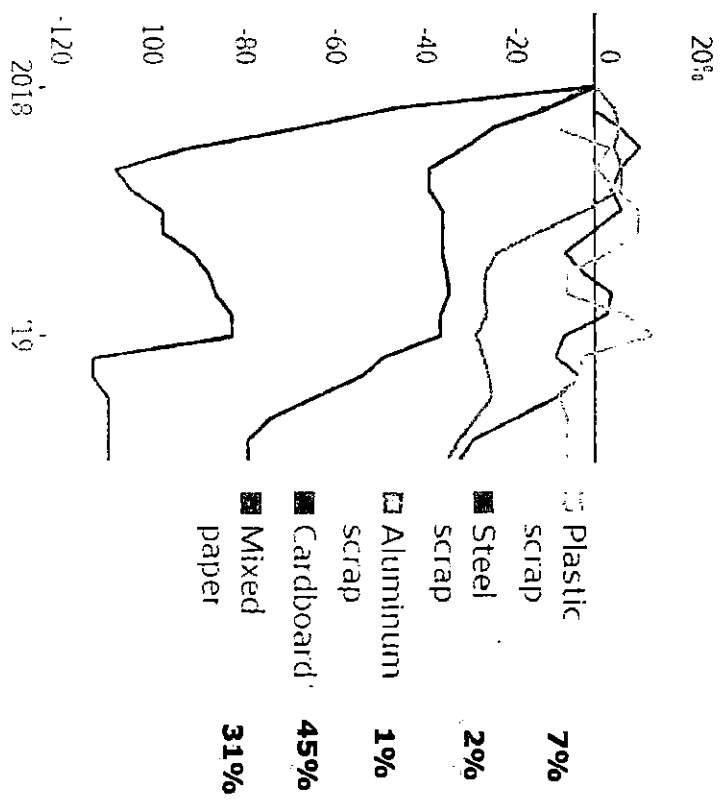
Source: Financial Times, Oct 24, 2018

Supply and demand economics continue in play as commodities flood alternate markets world wide

- China consumed a majority of Commodities globally
- Alternate markets are saturated; Some countries unprepared for influx

# Plunging Commodity Prices

Recycled commodity prices, percentage change from January 2018



Source: Wall Street Journal 9/9/19 = % of Republic Services material sold

- Glut of material oversupplies market
- Oversupplied markets further drive down commodity prices
- Cardboard, mixed paper and aluminum at all-time lows

76% of the material we sell has declined in value 78-105%.  
Not Shown - Glass makes up 7% of our material sold, and has declined 34%.





### Executive Summary

**Electric Utility Savings:** Anticipate savings of approximately \$97,981 in electric bills (55%) at current utility rates in the first year. These savings will grow as electric utility rates rise. The purchase of electric energy (kWh) from your utility is expected to be reduced by 55%.

Over 30 years, annual utility savings should average \$183,208, for a total utility savings of \$5,496,231. After tax effects are applied, savings average \$122,749 annually or \$3,682,476 over the system life.

### Annual Performance Summary

Solar Electric (PV) System: 500 kW DC producing 653,213 kWh/Year

#### Purchase Price & Net Cost

**Contract Price: \$1,329,268**

MACRS Bonus & Straight (\$402,376) (P.V.)  
 Line Depreciation:

**Net-Present Cost: \$926,892**

Includes present value (P.V.) of these future cash flows:

#### Financial Ratios

Customer's Profitability Index: 1.5



Cashflow Payback: 10.9 yrs.  
 11.6 yrs. (modified)

Internal Rate of Return (IRR): 9.3%

Modified IRR (MIRR): 8.3%

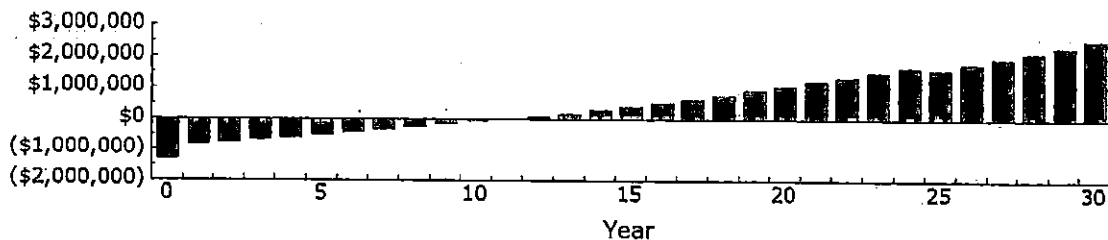
Net Present Value (NPV): \$654,575

Cash Gained over Life: \$2,554,555

- CO2 Saved over System Life: 16,069 tons. Equivalent to driving 32,138,000 auto miles

#### Finance: Cash

Cumulative Cash Flow







## Levelized Energy Cost (LEC)

**Your Hedge Against Utility Inflation:** Your investment in this project will protect you from utility rate inflation. Levelized Energy Cost (LEC) analysis provides us with a "hurdle rate" (the levelized energy cost) which can be compared to the expected change in utility rates (by way of utility rate inflation). LEC is the average lifetime cost of energy produced by a particular system. We can compare the LEC to the current utility rate and its expected change in price as time goes on. In this manner one can judge the investment as a "better bet" than utility rates to contain energy costs. Represented below is the average cost of utility energy versus the cost of energy produced (LEC) by your system over time.

### Electric: Levelized Energy Cost (LEC)

\$/kWh: Utility vs. System Levelized Energy Cost (LEC)

