

Recycling:

True Cost Study and Analysis



Prepared by:

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October 2021

Recycling: True Cost Study and Analysis

Purpose: To gather and aggregate raw data to determine the true cost of recycling to the Town of Ossipee.

Data Set & Sources: 2018-2020 figures were used for historical revenue purposes; see included documentation from vendors. Equipment and personnel costs are current as of 2021 and projected with modest increases

Exclusions: Facilities capital expenditures; Environmental Impact(s); Political Risks; Anecdotes and Social Narrative

Assumptions: Continue to sell all scrap metal including light iron and cans (unprocessed)

Net Revenue 2018-2020

Vendor	Material	2018 Revenue	2018 Expense	2018 NET	Note:
NRRA	Aluminum	\$16,536	\$0		
NRRA	Bailing Wire		\$1,005		(supplies to recycle)
NRRA	Mixed Paper		\$1,340		(paid to get rid of)
NRRA	Cardboard (OCC)	\$3,415			
NRRA	Griples		\$1,003		(supplies to recycle)
CASELLA	Cardboard (OCC)	\$2,198			Reporting on a net revenue basis
CASELLA	Mixed Paper	\$236			Reporting on a net revenue basis
CASELLA	#1-7 Plastic	\$790			Reporting on a net revenue basis
TOTAL:		\$23,175	\$3,348		
2018 Yearly Net Revnue (before Personnel and Machinery)				\$19,827	
Vendor	Material	2019 Revenue	2019 Expense	019 Total Net Revenue	Note:
NRRA	Aluminum				
NRRA	Bailing Wire		\$1,150		(supplies to recycle)
NRRA	Mixed Paper		\$694		(paid to get rid of)
NRRA	Cardboard (OCC)	\$3,684			
NRRA	#1-7 Plastic	\$724			
NRRA	Griples		\$1,004		(supplies to recycle)
CASELLA	Cardboard (OCC)	\$1,616			Hauling cost offset material value complete
TOTAL:		\$6,024	\$2,848		
2019 Yearly Net Revnue (before Personnel and Machinery)				\$3,176	
Vendor	Material	2020 Revenue	2020 Expense	020 Total Net Revenue	
NRRA	Aluminum	\$18,444	\$215		
NRRA	Bailing Wire		\$2,090		
NRRA	Mixed Paper		\$1,077		
NRRA	Cardboard (OCC)	\$2,881			
NRRA	Griples		\$1,781		
CASELLA	Cardboard (OCC)	\$1,805			
CASELLA	#1-7 Plastic	\$852			
TOTAL:		\$23,130	\$5,163		
2020 Yearly Net Revnue (before Personnel and Machinery)				\$17,967	
3 year average:				\$13,657	

**Avg Net
Revenue:
\$13,657**

Personnel and Equipment

Projected Cost to Recycle	2021	2022	2023	2024
Personnel Cost (FT Wage plus Benefits)	\$74,101.86	\$75,583.90	\$77,095.58	\$78,637.49
Skid Steer Purchase/Replace Cost	\$8,500.00	\$8,840.00	\$9,193.60	\$9,561.34
Skid Steer Maintenance	\$2,000.00	\$2,080.00	\$2,163.20	\$2,249.73
Balers Cost/Replace	\$7,500.00	\$7,800.00	\$8,112.00	\$8,436.48
Balers Maintenance	\$1,560.00	\$1,622.40	\$1,687.30	\$1,754.79
Storage Containers Cost/Replcae	\$1,333.33	\$1,386.67	\$1,442.13	\$1,499.82
Fuel and Electricity*	\$4,500.00	\$4,680.00	\$4,867.20	\$5,061.89
Total Projected Cost	\$99,495.19	\$101,992.96	\$104,561.00	\$107,201.53

Average P&E Cost of the next three years
3 Years' P&E Costs

\$104,585.17
\$313,755.50



**Avg P&E
Cost:
\$104,585**

* Additional fuel and electricity specific to recycling

Machine/Equipment	Purchase Price	Years Amortized	Starting Annual Exp	Inflation factor
Skid Steer	\$85,000	10	\$8,500	4%
(2) Balers	\$150,000	20	\$7,500	4%
Storage Containers	\$20,000	15	\$1,333	4%

Cost to put recyclables in MSW

Cost to put Recyclable in MSW (130 Tons Average per year)	Dumping Fee	Hauling Fee	Total Yearly Cost for Hauling and Dumping
1st Year of Operation without Recycling (2022)	\$9,880.00	\$4,015.00	\$13,895.00
2nd Year of Operations without Recycling (2023)	\$10,324.60	\$4,195.73	\$14,520.33
3rd Year of Operations without Recycling (2024)	\$10,788.70	\$4,384.49	\$15,173.19
Total 3 Years Cost	\$30,993.30	\$12,595.22	\$43,588.52

MSW Hauling and Dumping Fees

1st Year - \$76.00 Per Ton - \$365.00 per haul (Single)

2nd Year - \$79.42 Per Ton - \$381.43 per haul (Single)

3rd Year - \$82.99 Per Ton - \$398.59 per haul (Single)

**Avg MSW
Increase
\$14529**

Average MSW increase to include recyclables \$14,529



Projected Savings By Not Recycling

Projected Savings If Recycling Discontinued	2022	2023	2024	3 Year Total
Revenue from Recycling (net from supplies)	-\$13,656.67	-\$14,202.93	-\$14,771.05	-\$42,630.65
Recycling P&E Cost to the Town	\$101,992.96	\$104,561.00	\$107,201.53	\$313,755.50
Increased Hauling Cost w/o Recycling	-\$13,895.00	-\$14,520.33	-\$15,173.19	-\$43,588.52
Savings by Not Recycling	\$74,441.30	\$75,837.74	\$77,257.29	\$227,536.33

\$75,000+
Savings/
year

Conclusion

Based on the recycling materials market for the last 4+ years, it costs Ossipee an extra \$75,000/year to recycle. That number will grow unless the price of recycled goods drastically changes.

If the town discontinued recycling, the data strongly suggests a savings of \$227,000 in the next three years.

**Save over
\$227,000 in
Next 3 years**

1/15/2019



Partnering to Make Recycling Strong Through Economic and Environmentally
Sound Solutions

Northeast Resource Recovery Association, 2101 Dover Road, Epsom, NH 03234

Telephone: (603) 736-4401

Fax: (603) 736-4402

E-mail: info@nrna.net

Web Site: www.nrra.net



Activity Detail Report

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Ossipee, NH

Commodity	Pickup Date	Release #	Lbs.	Net Tons	Gross Tons	# of Units	Price	Haul Charge	Revenue	Program Expenses	Net Revenue/Expenses
Alum Can-Baled	8/27/18	347374	29,067	14.53	12.98	53	\$0.569		\$16,536.22		
Subtotals			29,067	14.53	12.98				16,536.22		
Baling Wire	5/17/18	342643				10	\$91.600	\$89.31		\$1,005.31	
Subtotals								\$89.31		\$1,005.31	
Fibers-Mixed Baled	5/24/18	342997	46,100	23.05	20.58	1	\$58.150			\$1,340.36	
Subtotals			46,100	23.05	20.58					\$1,340.36	
Fibers-OCC Baled	7/6/18	933881	40,265	20.13	17.98	1	\$80.000		\$1,610.60		
Fibers-OCC Baled	9/20/18	348257	42,464	21.23	18.96	35	\$85.000		\$1,804.72		
Subtotals			82,729	41.36	36.93				3,415.32		
Freon-Units	4/24/18	341521				75	\$9.000			\$675.00	
Freon-Units	7/13/18	345173				55	\$9.000			\$495.00	
Freon-Units	10/11/18	349455				68	\$8.000			\$544.00	
Subtotals										\$1,714.00	
Glass-PGA	6/18/18	344186	23,780	11.89	10.62	1	\$30.000			\$356.70	
Glass-PGA	7/12/18	345172	17,080	8.54	7.63	1	\$30.000			\$256.20	
Glass-PGA	8/20/18	347071	23,820	11.91	10.63	1	\$30.000			\$357.30	
Glass-PGA	9/7/18	348042	16,540	8.27	7.38	1	\$30.000			\$248.10	
Subtotals			81,220	40.61	36.26					\$1,218.30	
Gripples	11/24/18	350632				1000	\$0.950	\$53.70		\$1,003.70	
Subtotals								\$53.70		\$1,003.70	
Scrap-Metal	1/24/18	338660	12,500	6.25	5.58	1	\$100.000	\$100.00	\$558.04	\$100.00	
Scrap-Metal	2/26/18	339771	10,260	5.13	4.58	1	\$90.000	\$100.00	\$412.24	\$100.00	

Report provided by: Windows User

report date: 1/15/2019

1/16/2020



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Baling Wire	4/25/19	356500				10	\$104.940	\$101.20		\$1,150.60	
		Subtotals						\$101.20		\$1,150.60	
Paper Fibers-Mixed Baled	8/22/19	361714	43,980	21.99	19.63	1	\$10.000	\$475.00		\$694.90	
		Subtotals	43,980	21.99	19.63			\$475.00		\$694.90	
Curd Fibers-OCC Baled	4/11/19	356012	40,274	20.14	17.98	35	\$60.000		\$1,208.22		
Fibers-OCC Baled	8/8/19	360150	44,086	22.04	19.68	37	\$42.500		\$936.83		
Fibers-OCC Baled	10/10/19	362995	45,028	22.51	20.10	36	\$35.000		\$787.99		
Fibers-OCC Baled	12/20/19	366828	42,966	21.48	19.18	1	\$35.000		\$751.91		
		Subtotals	172,354	86.18	76.94				3,684.95		
Freon-Units	5/6/19	356476				94	\$9.000			\$846.00	
Freon-Units	7/29/19	360280				84	\$9.000			\$756.00	
Freon-Units	10/18/19	363907				119	\$8.000			\$952.00	
		Subtotals								\$2,554.00	
Glass-PGA	5/28/19	357754	22,740	11.37	10.15	1	\$35.000			\$397.95	
		Subtotals	22,740	11.37	10.15					\$397.95	
Gripples	7/12/19	359363				1000	\$0.950	\$54.12		\$1,004.12	
		Subtotals						\$54.12		\$1,004.12	
Plastic -1-7 Baled	8/5/19	361086	28,960	14.48	12.93	36	\$0.025		\$724.00		
		Subtotals	28,960	14.48	12.93				724.00		
Propane- 20#	12/10/19	365614				43	\$2.000		\$86.00		
Propane- 20#	12/10/19	365614				29	\$2.000			\$58.00	
		Subtotals							86.00	\$58.00	

Report provided by: Windows User

report date: 1/16/2020

1/19/2021



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Alum Can-Baled	11/30/20	380101	19,380	9.69	8.65	45	\$0.435		\$8,430.30		
Alum Can-Baled	12/3/20	380102	23,020	11.51	10.28	1	\$0.435		\$10,013.70		
Subtotals			42,400	21.20	18.93				18,444.00		
Alum Can-Surch.	11/30/20	380101				1	\$215.290			\$215.29	
Subtotals										\$215.29	
Baling Wire	1/10/20	367478				10	\$91.620	\$104.00			\$1,020.20
Baling Wire	10/16/20	378409				10	\$96.420	\$106.20			\$1,070.40
Subtotals								\$210.20		\$2,090.60	
Fibers-Mixed Baled	2/10/20	368768	46,220	23.11	20.63	37	\$25.000	\$500.00			\$1,077.75
Subtotals			46,220	23.11	20.63			\$500.00		\$1,077.75	
Fibers-OCC Baled	3/19/20	369905	40,630	20.32	18.14	36	\$65.000		\$1,320.48		
Fibers-OCC Baled	9/24/20	377371	44,800	22.40	20.00	36	\$69.690		\$1,561.06		
Subtotals			85,430	42.72	38.14				2,881.54		
Freon-Units	5/7/20	371105				93	\$9.000				\$837.00
Freon-Units	7/16/20	374507				56	\$9.000				\$504.00
Freon-Units	9/10/20	376560				48	\$9.000				\$432.00
Freon-Units	11/23/20	379494				81	\$8.000				\$648.00
Subtotals										\$2,421.00	
Gripples	2/3/20	367474				1	\$583.000	\$29.18			\$612.18
Gripples	7/30/20	374622				1	\$550.000	\$26.85			\$576.85
Gripples	10/30/20	378412				1	\$550.000	\$42.53			\$592.53
Subtotals								\$98.56		\$1,781.56	

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Your Recycling Gets Recycled, Right? Maybe, or Maybe Not

Plastics and papers from dozens of American cities and towns are being dumped in landfills after China stopped recycling most “foreign garbage.”



By Livia Albeck-Ripka

May 29, 2018

Oregon is serious about recycling. Its residents are accustomed to dutifully separating milk cartons, yogurt containers, cereal boxes and kombucha bottles from their trash to divert them from the landfill. But this year, because of a far-reaching rule change in China, some of the recyclables are ending up in the local dump anyway.

In recent months, in fact, thousands of tons of material left curbside for recycling in dozens of American cities and towns — including several in Oregon — have gone to landfills.

In the past, the municipalities would have shipped much of their used paper, plastics and other scrap materials to China for processing. But as part of a broad antipollution campaign, China announced last summer that it no longer wanted to import “foreign garbage.” Since Jan. 1 it has banned imports of various types of plastic and paper, and tightened standards for materials it does accept.

While some waste managers already send their recyclable materials to be processed domestically, or are shipping more to other countries, others have been unable to find a substitute for the Chinese market. “All of a sudden, material being collected on the street doesn’t have a place to go,” said Pete Keller, vice president of recycling and sustainability at Republic Services, one of the largest waste managers in the country.

China’s stricter requirements also mean that loads of recycling are more likely to be considered contaminated if they contain materials that are not recyclable. That has compounded a problem that waste managers call wishful or aspirational recycling: people setting aside items for recycling because they believe or hope they are recyclable, even when they aren’t.

[Here’s a guide to avoiding “aspirational recycling.” First lesson: Don’t recycle greasy pizza boxes.]

In the Pacific Northwest, Republic has diverted more than 2,000 tons of paper to landfills since the Chinese ban came into effect, Mr. Keller said. The company has been unable to move that material to a market “at any price or cost,” he said. Though Republic is dumping only a small portion of its total inventory so far — the company handles over five million tons of recyclables nationwide each year — it sent little to no paper to landfills last year.

But for smaller companies, like Rogue Disposal and Recycling, which serves much of Oregon, the Chinese ban has upended operations. Rogue sent all its recycling to landfills for the first few months of the year, said Garry Penning, a spokesman.



Wiqan Ang for The New York Times

Western states, which have relied the most on Chinese recycling plants, have been hit especially hard. In some areas — like Eugene, Ore., and parts of Idaho, Washington, Alaska and Hawaii — local officials and garbage haulers will no longer accept certain items for recycling, in some cases refusing most plastics, glass and certain types of paper. Instead, they say, customers should throw these items in the trash.

Theresa Byrne, who lives in Salem, Ore., said the city took too long to inform residents that most plastics and egg and milk cartons were now considered garbage. “I was angry,” she said. “I believe in recycling.”

Other communities, like Grants Pass, Ore., home to about 37,000 people, are continuing to encourage their residents to recycle as usual, but the materials are winding up in landfills anyway. Local waste managers said they were concerned that if they told residents to stop recycling, it could be hard to get them to start again.

It is “difficult with the public to turn the spigot on and off,” said Brian Fuller, a waste manager with the Oregon Department of Environmental Quality.

The fallout has spread beyond the West Coast. Ben Harvey, the president of E.L. Harvey & Sons, a recycling company based in Westborough, Mass., said that he had around 6,000 tons of paper and cardboard piling up, when he would normally have a couple hundred tons stockpiled. The bales are filling almost half of his 80,000-square-foot facility.

“It’s really impacted our day-to-day operations,” Mr. Harvey said. “It’s stifling me.”

Recyclers in Canada, Australia, Britain, Germany and other parts of Europe have also scrambled to find alternatives.

Still, across much of the United States, including most major cities, recycling is continuing as usual. Countries like India, Vietnam and Indonesia are importing more of the materials that are not processed domestically. And some waste companies have responded to China’s ban by stockpiling material while looking for new processors, or hoping that China reconsiders its policy.



Republic Services collecting recycled materials in Kent, Wash. Wigan Ang for The New York Times

Americans recycle roughly 66 million tons of material each year, according to the most recent figures from the Environmental Protection Agency, about one-third of which is exported. The majority of those exports once went to China, said David Biderman, the executive director of the Solid Waste Association of North America, a research and advocacy group.

But American scrap exports to China fell by about 35 percent in the first two months of this year, after the ban was implemented, said Joseph Pickard, chief economist for the Institute of Scrap Recycling Industries, a trade group.

“It’s a huge concern, because China has just been such a dominant overseas market for us,” Mr. Pickard said.

In particular, exports of scrap plastic to China, valued at more than \$300 million in 2015, totaled just \$7.6 million in the first quarter of this year, down 90 percent from a year earlier, Mr. Pickard said. Other countries have stepped in to accept more plastics, but total scrap plastic exports are still down by 40 percent this year, he said.

“There is a significant disruption occurring to U.S. recycling programs,” Mr. Biderman said. “The concern is if this is the new normal.”

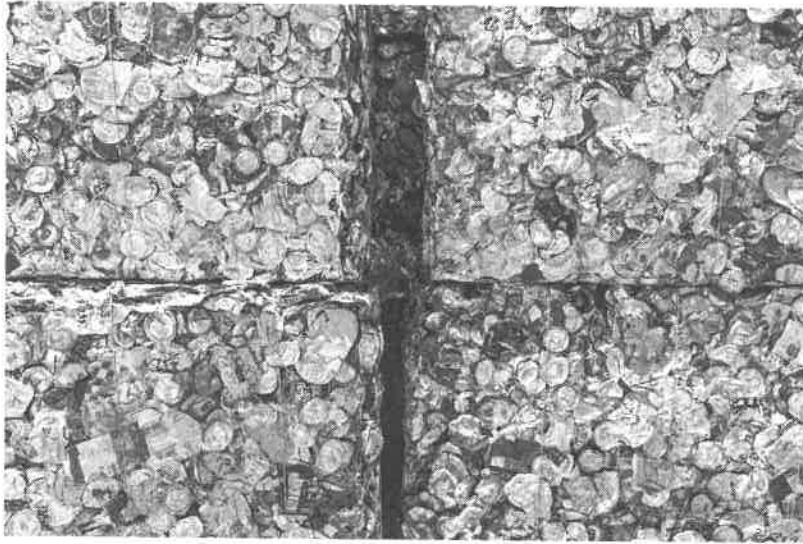
Curbside recycling is typically hauled by a private company to a sorting plant, where marketable goods are separated out. Companies or local governments then sell the goods to domestic or overseas processors. Some states and cities prohibit these companies from dumping plastic, paper and cardboard, but some local officials — including in Oregon, Massachusetts and various municipalities in Washington

State — have granted waivers so that unmarketable materials can be sent to the landfill.

Recycling companies “used to get paid” by selling off recyclable materials, said Peter Spendelow, a policy analyst for the Department of Environmental Quality in Oregon. “Now they’re paying to have someone take it away.”

In some places, including parts of Idaho, Maine and Pennsylvania, waste managers are continuing to recycle but are passing higher costs on to customers, or are considering doing so.

“There are some states and some markets where mixed paper is at a negative value,” said Brent Bell, vice president of recycling at Waste Management, which handles 10 million tons of recycling per year. “We’ll let our customers make that decision, if they’d like to pay more and continue to recycle or to pay less and have it go to landfill.”



Wiqan Ang for The New York Times

Mr. Spendelow said companies in rural areas, which tend to have higher expenses to get their materials to market, were being hit particularly hard. “They’re literally taking trucks straight to the landfill,” he said.

Will Posegate, the chief operations officer for Garten Services, which processes recycling for a number of counties in Oregon, said his company had tried to stockpile recyclables but eventually used a waiver to dump roughly 900 tons. “The warehouse builds up so much that it’s unsafe,” he said.

In California, officials are concerned that improperly stored bales of paper could become hazards during wildfire season, said Zoe Heller, the policy director for the state’s recycling department.

While China has entirely banned 24 materials, including post-consumer plastic and mixed paper, it has also demanded that other materials, such as cardboard and scrap metal, be only 0.5 percent impure. Even a small amount of food scraps or other rubbish, if undetected, can ruin a batch of recycling.

Some waste managers say that China’s new contamination standards are impossible to meet, while others are trying to clean up their recycling streams by slowing down their processing facilities, limiting the types of materials they accept or trying to better educate customers on what belongs in the recycling bin.



Waste traveling along a conveyor belt to be sorted. Wigan Ang for The New York Times

Mr. Bell, the Waste Management executive, said he had seen everything from Christmas lights to animal carcasses to artillery shells come through the company's recycling facilities. "Most of our facilities get a bowling ball every day or two," he said.

Some materials can ruin a load, he said, while others pose fire or health hazards and can force facilities to slow their operations and in some cases temporarily shut down. (And a bowling ball could do serious damage to the equipment.) Approximately 25 percent of all recycling picked up by Waste Management is contaminated to the point that it is sent to landfills, Mr. Bell said.

Recyclers have always disposed of some of their materials. But the percentage has climbed as China and other buyers of recyclable material have ratcheted up quality standards.

Most contamination, Mr. Bell said, happens when people try to recycle materials they shouldn't. Disposable coffee cups — which are usually lined with a thin film that makes them liquid-proof but challenging and expensive to reprocess — are an example. Unwashed plastics can also cause contamination.

"If we don't get it clean, we're not going to be able to market it, and if we can't market it unfortunately it's going to go to the landfill," said Mr. Penning, the Rogue spokesman. In March, Rogue told customers to put everything in the trash except for corrugated cardboard, milk jugs, newspapers and tin and aluminum cans, which the company is finding domestic markets for, Mr. Penning said.

Rogue customers who make mistakes might see an "Oops" sticker the next time they check their recycling bin, he said.

In Eugene, similar restrictions have been imposed by the waste company Sanipac. These have not sat well with some residents. "Eugene is a very green city and people love their recycling here," said Diane Peterson, a resident. "There are a lot of things like yogurt containers that we get all the time, and now we can't recycle them."

Leah Geocarlis, another Eugene resident, said the change had prompted her to try to consume less overall. "On the one hand, I hate it, because I don't want stuff to end up in landfill," she said. "On the other hand, it's a wake-up call."

"Recycling is the third R," she said. "You have to reduce and reuse first."