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The Quest for Zero Waste

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QUEST for Zero Waste in Missoula

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QUEST Program of the Davidson Honors College, City of Missoula



QUEST and ZERO by FIFTY

In 2016, the City of Missoula set a series of targets to reach 90% diversion from landfills by 2050 in Resolution 8044. In 2018, the City released a comprehensive ZERO by FIFTY plan that outlined and prioritized strategies for the city to divert waste and achieve its goal. The QUEST program empowers students to propose solutions to local issues. The 2019 QUEST Challenge focuses on the City's diversion goals.

ZERObyFIFTY Targets

- Target 1: 30% or better by 2025
- Target 2: 40% or better by 2030
- Target 3: 60% or better by 2040
- Goal: 90% or better by 2050

Methodology

- National and state data on waste stream trends
- Reviewed ZERO by FIFTY plan for Missoula
- Researched similar cities with successful diversion
- Conducted root cause analysis, SWOT analysis, and cost benefit analysis for our solutions

Problem Statement

Missoula's current waste management system is expensive for businesses and residents, fails to adequately capture the value of involved materials, conflicts with Missoula's values, and is unsustainable. Montanans send two times as much waste to landfills than the average American (see Figure 1 below.) Recent incidents like the March wind event

Average Individual Daily Landfill Contribution



Figure 1: From EPA(1) and MT DEQ(2) data from 2015 and 2016, MT's average daily per capita landfill contribution more than double the national average. that blew trash bags and other trash materials into the public view (see Figure 2 below) have underlined the need for a change in Missoula's practices.



Figure 2: (Left) The plastic bag flying trash issue of 3/19. (Right) A picture of Missoula's North Hills landfill.

Problem Analysis

Right now, it is expensive and difficult to divert waste in Missoula. Figure 3 shows the comparison of the costs of paying for trash vs other services to divert waste. In this scheme, the cheapest option for residents is to pay for just trash pickup. Thus recyclable and compostable materials are sent to the landfill, instead of being diverted where they could bring jobs and revenue to the Missoula economy. Over 78% of Missoula's waste stream could be either recycled or composted, but current estimates place our diversion rate at just 17%. Missoula also has a problem with trash bags. They interfere with recycling sorting machinery, make landfill management more difficult, and degrade Missoula's aesthetic beauty.

Average Waste Pickup Costs Monthly Annually

Service	Monthly	Annually
Trash	\$27	\$324
Trash and Recycling	\$40	\$480
Trash, Recycling, Compost	\$55	\$660

Figure 3: The above table uses averages of Missoula trash and recycling pickup subscription costs. Data was provided by Chad Bauer of Republic Services. We used the cheapest possible compost subscription with Missoula Compost LLC for the compost price estimate.

Proposed Solutions

1. Bag-based Pay-As-You-Throw System

- Trash service costs are tied to the number of bags each person puts out.
- The more you send to the landfill, the more you pay.
- Bags could be sold in an easily identifiable color with a Missoula city logo. (see Figure 4 below)

2. Universal Recycling

- This would require that recycling be provided with trash pickup.
 - If you pay for trash, you pay for recycling.
- ##### 3. Allow Every-Other-Week Trash Pickup
- Missoula city ordinance requires weekly trash pickup.
 - Allow for less-frequent pickup and more flexible pricing options.

4. Implement Tax on Plastic and Paper Bags

- A \$0.10 fee on paper and plastic bags at checkout
- Some exceptions

5. Conduct Baseline Waste Characterization Study

- Collect data on the weight, type, and sources of waste in Missoula

Figure 4: A City PAYT bag from Fall River, Massachusetts. Missoula could adopt bags like these to reduce waste.



Expected Results

From our analyses, we expect our proposals could have a huge influence on Missoula. Our pay-as-you-throw trash bag system could reduce costs for residents while diverting waste from away from the landfill and into Missoula's economy instead. Other communities have achieved a wide range of diversion rates with PAYT. We reference the subject of our case study, Malden Massachusetts to predict results in Missoula. (3)



Malden, MA
Population: 60,000
Average Income: \$54k

Within the first six months of implementing their program, Malden almost halved their solid waste tonnage. At the same time, they increased their recycling rate by 74%. They also \$17 million in revenue go to the city for the sale of the bags. (4)

Benefits

Adopting this system could benefit Missoula in the following ways:

1. Estimated \$230* or more per household in annual savings
2. 5.8 lbs** of waste reduced daily per capita which is an estimated 30-60% reduction in waste. In addition we estimate a range of 45-75% increase in recycling.
3. 93,000*** tons of waste diverted from landfill, annually
4. \$7 million**** in total revenue for city and businesses from bag taxes.
5. Creates waste awareness that incentivizes positive behavior
6. Economic development opportunities for existing and new composting and recycling companies
7. Increased landfill lifespan saves millions, low estimated operational cost. EOW Pickup reduces fuel and labor costs to offset operational change costs

*figure assumes customer spends \$200 or less on garbage bags per Malden Case Study. See appendix for all calculations.

**Figure assumes averages of research predictions after one year, 50% reduction due to behavioral changes and 65% diversion rate from increasing recycling and composting.

***Figure derives data from the 2016 Montana DEQ recycling report [2].

****Figure assumes \$0.10 tax on plastic and paper bags with American average of 1,500 bags per year, per NRDC[6] report see references. Missoula: 47,963 households with 2.3 individuals each per the Montana Census [7]

Recycling + Trash Current Cost	Future Monthly Price Total	Monthly Residential Savings	Annual Household Savings
\$45.15	\$25.00	\$20.15	\$241.80

Figure 5: The changes to the system that we have suggested could save Missoula residents more than \$200 every year. Figures based on Malden case study and information from Republic Services.

Barriers

There are several barriers Missoula would have to overcome to successfully implement these policies. The automatic trash collection systems in use by Republic Services would make it difficult for the garbage haulers to easily tell when households are not in compliance. Other cities like Wrentham, Massachusetts have overcome this problem. (3)

Additional barriers include:

- Every-other-week pickup: alter the current city ordinance 8.28.060 that mandates trash collection every 7 days.
- Bag tax in Missoula stores will require voluntary implementation until further legal exploration of city jurisdiction is completed in collaboration with the City Attorney, Jim Nugent.
- Agreement from republic services required to implement PAYT

Summary And Conclusions

A bag-based PAYT system is the cheapest, most equitable, and highest impact action Missoula can take to reach its diversion goals. Accompanying it with every other week trash pickup and mandatory universal recycling would lower prices for residents, save waste haulers money, and make the effects of the PAYT system much more pronounced.



CONDUCT BASELINE WASTE CHARACTERIZATION STUDY



IMPLEMENT BAG-BASED PAYT SYSTEM WITH RECYCLING AND EVERY-OTHER-WEEK PICKUP



IMPLEMENT A PAPER AND PLASTIC BAG TAX

References

- (1) EPA 2015 Waste Management Report
- (2) MT DEQ 2015 Recycling Report
- (3) Malden report
- (4) Waste Zero Malden Report
- (5) Waste Zero Report
- (6) January 09, 2. (2016, December 15). NRDC Lauds Passage of New York City Council Legislation Requiring Groceries, Retailers to Provide Plastic Bag Recycling for Consumers.
- (7) U.S. Census Bureau QuickFacts: Missoula County, Montana

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