Recycling in Sitka: A Look Towards the Future

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Scenario I: No Action; Status Quo

Overview

Sitka currently has a separated stream program, meaning the stream is separated (cardboard from mixed paper, plastic #1 from glass, etc.) at the source (~~Katlian St.~~ recycle center). The current program has several benefits and disadvantages. The program will continue in its present form until 2010, when the City and Borough of Sitka ("City") renegotiates its contract with Rabanco for the processing, transport, and sale of recyclables expires.

The City's program currently nets over $40,000 in annual savings by reducing the tonnage of municipal solid waste ("MSW") produced by Sitkans. On average, the City saves $0.0344 for every pound of recyclables that is collected.

While Sitka's recycling program financially benefits the City, Sitka's separated stream program leaves little room to expand. Additionally, the recycling program's financial benefit is likely to be greatly curtailed when or if the City's contract with Rabanco is renewed. Finally — and perhaps of greater concern — the capacity of the City's baling facility operates at near maximum capacity and the current system for baling recyclables, especially plastics, is rife with inefficiencies.

Logistics

How the Current System Works

When a Sitkan deposits a piece of cardboard at the ~~Katlian St.~~ recycle center, it endures a long and complicated journey administered in entirety by Rabanco (a division of Allied Waste, Inc.), with much of the handling and processing subcontracted to Stragier Sanitation (a division of Alaska Pacific Environmental Services) and Alaska Marine Lines ("AML").

When the green roll-off containers located at the ~~Katlian St.~~ recycle center have been filled to capacity, they are trucked to the City's baling and recycling facility at Sawmill Cove Industrial Park by a Stragier employee. At the baling facility, the contents of the container are emptied and sorted into large piles. After a pile becomes big enough, the recyclables are baled by Stragier employees using a large horizontal Selco baler on loan to the City and Stragier from Rabanco. Stragier employees load the bales into an AML container van for shipment.

The container van of recyclables is shipped to Seattle, trucked to Rabanco's Seattle processing facility, the bales are broken apart, assimilated into the facility's larger stream of recyclables, and finally rebaled for sale on the world market.

It is important to noted the aforementioned system applies only to cardboard, mixed paper, and shredded paper.

For tin cans/steel #2, the system is identical with the exception of tin cans/steel #2 being cubed, instead of baled. Once cubed, the tin cans/steel #2 join the rest of the recyclables for shipment to Seattle.

For glass, City employees using a City vehicle truck the large green roll-off container from ~~Katlian St.~~ to the Sawmill Cove recycling and baling facility where it is either crushed using a glass crusher creating a higher-grade end-product (used for pipe bedding, for instance), or crushed with a track-hoe creating a lower-grade end-product. The crushed glass is reused on-island.

For aluminum, City employees using a City vehicle truck the large green roll-off containers from ~~Katlian St.~~ to the Sawmill Cove recycling and baling facility where it is cubed by City employees using a City machine and shipped by the Baranof Barracudas Swim Club ("BBSC") to Seattle for sale. BBSC reimburses the City for the cost of trucking the aluminum from ~~Katlian St.~~ to Sawmill Cove, however the City — per its contract with BBSC — absorbs (subsidizes) the operational cost of baling the aluminum.

For plastics, the large white bags containing plastic #1, pigmented plastic #2, and non-pigmented plastic #2 are trucked from ~~Katlian St.~~ to the Sawmill Cove recycling and baling facility by ~~Norm Campbell,~~ an employee of Community Schools using a Community Schools vehicle. ~~Norm~~ bales the plastic using a small baler purchased by the City (not the Selco baler used by Stragier Sanitation). The bales of plastic are shipped with the rest of the recyclables to Seattle.

Identified Problems

- The current system is inconvenient to the consumer.

Year	Recyclables (tons)	MSW (tons)	Diversion rate
2004	482.39	8590.38	5.61%
2005	567.57	8512.07	6.67%
2006	589.09	8530.96	6.9%
2007	617.66	8930.78	6.92%

- Sitka's diversion rate — the percentage of recyclables diverted from the MSW stream — has plateaued at 7 percent (see table). The diversion rate is unlikely to break through a ceiling of 10 percent because of the recycling program's inherent inconveniences to the consumer: forcing residents to sort their recyclables and bring the recyclables to a centralized location. The low diversion rate consequently limits financial savings to the City.
- The financial benefit to the City is artificially inflated. Stragier Sanitation, which subcontracts with Rabanco, is likely operating at a loss because of the inefficiencies of the City's processing and baling system. If the contract is renewed and the operations scheme remains the same, Stragier will likely request more money — anywhere from 10 to 50 percent —for each pound of recyclables Stragier processes, in order to cover its actual costs. This increased expense will correspondingly reduce the cost savings of recycling vis-a-vis MSW.
- The City's baling facility is at capacity. Even if the City substantially increased its diversion rate (i.e., volume of recyclables), the baling facility would simply not be able to process the influx of recyclables. The facility is too small.

Costs

First, I will outline the unit cost of MSW. The numbers below are derived from the City's processing, shipping, and disposal contract with Rabanco and the City's collection contract with Stragier Sanitation. All figures come from the 2007 calendar year.

Service	Contractor/provider	Cost (per pound)
Collection (70.1% of MSW)	Stragier	*$0.0511*[1]
Direct disposal by general public (29.9% of MSW)	General public	*$0.00*
Average cost of collection/ disposal[2]	Stragier, general public	$0.0358
Processing (Jarvis St. transfer station)	Rabanco (through Stragier)	$0.0144
Shipping and disposal	Rabanco	$0.0531
Comprehensive cost of MSW	**All of the above**	**$0.1033**

Notes:

1) All of the costs above are assessed on a per pound basis except the City's collection contract with Stragier, which charges the City for the number and frequency of refuse containers Stragier empties. In order to create a common unit for comparison, the value of Stragier's contract in 2007 was divided by the tonnage of MSW collected in 2007 to calculate a per pound cost for Stragier's services.

2) The "average cost of collection disposal" ($0.0358) is a weighted average between collection conducted by Stragier ($0.0511/lb.) and direct disposal by the general public ($0.00/lb.), which consists of individuals or businesses delivering refuse directly to the Jarvis St. transfer station.

Second, I will outline the unit cost of recyclables (excepting glass, which is its own category). The numbers below are derived from the City's collection, baling, shipping, and reprocessing contract with Rabanco; the City's coordination contract ~~with Community Schools (i.e., Norm Campbell);~~ and the City's recycling-related advertising expenditures. All figures come from the 2007 calendar year unless otherwise noted.

Service	Contractor/provider	Cost (per pound)
Collection and baling	Rabanco (through Stragier)	$0.0301[1]
Shipping	Rabanco (through AML)	$0.0288
Reprocessing and sale	Rabanco	$0.0241
Coordination	Community Schools	$0.0291[2]
Advertising	City and Borough of Sitka	$0.0038[3]
Comprehensive cost of recycling	**All of the above**	**$0.1159**

Notes:
1) As previously noted, this cost is artificially low and could substantially increase when Stragier renews its contract and demands more money to match its actual expenses.
2) This is a flat per year contract independent from the volume of recyclables the City handles. In the 2007 financial year, Community Schools received $24,000 for its services; in 2008 the Assembly increased the contract to $36,000 annually. In order to create a common unit for comparison, the $36,000 annual contract was divided by the tonnage of recyclables handled in 2007 to calculate a per pound cost for Community Schools' services.
3) This figure varies annually. Community Schools and Norm Campbell submit advertisements to the media when desired, but the cost of the advertising is paid by the City. In order to create a common unit for comparison, the advertising expenditures from the 2007 calendar year — $4,684.29 — was divided by the tonnage of recyclables handled in 2007 to calculate a per pound cost for advertising.

Of course, recyclables, unlike MSW, have market value. Below is a calculation of income generated from recyclables and the subsequent net cost of recycling.

Comprehensive cost of recycling	$0.1159/lb.
Income generated from recycling	+$0.0471/lb.[1]
Net cost of recycling	**$0.0688/lb.**

Note:
1) The breakdown of income generated from recyclables at July 2007 market rates:
(669,480 lbs. cardboard)x($0.063/lb.)=$42,177
(51,000 lbs. newsprint)x($0.058/lb.)=$2,958
(425,440 lbs. mixed paper)x($0.0129/lb.)=$5,488
(23,740 lbs. tin/steel #2)x($0.19/lb.)=$4,511
Total income from recyclables: $55,134
Average revenue/lbs. of recyclables handled in 2007 (all commodities except glass): $0.0471/lb.

Third, I will outline the unit cost of glass, which is processed differently from other recyclable commodities..

Service	Contractor/provider	Cost (per pound)
Transportation	City and Borough of Sitka	$0.0122

Crushing, grinder (10% of all glass)	City and Borough of Sitka	*$0.13*
Crushing, track-hoe (90% of all glass)	City and Borough of Sitka	*$0.0088*
Average cost of crushing[1]	City and Borough of Sitka	$0.0252
Coordination	Community Schools	$0.0291[2]
Advertising	City and Borough of Sitka	$0.0038[3]
Comprehensive cost of glass recycling	**All of the above**	**0.0703**

Notes:
1) The "average cost of crushing" ($0.0252) is a weighted average between glass crushed by the glass crushing machine ($0.13/lb.) and glass crushed by a track-hoe ($0.0088).
2) See note on the coordination contract from two table above.
3) See note on advertising expenditures from two tables above.

Fourth, I will outline the net unit cost of recycling in Sitka. The net unit cost of recycling is the weighted average of the cost to recycle all commodities except glass and the cost to recycle glass.

Net cost of recycling (all commodities except glass)	$0.0688/lb.
Cost of recycling glass	$0.0703/lb.
Average net cost of recycling (all commodities)	**$0.0689/lb.**

Fifth, I will outline the per unit savings from recycling (vis-a-vis MSW).

Comprehensive cost of MSW	$0.1033/lb.
Average net cost of recycling (all commodities)	$0.0689/lb.
Net savings generated by recycling	**$0.0344/lb.**

Sixth and last, I will outline the total savings generated by recycling in the 2007 calendar year:

(1,235,320 pounds of recyclables)x($0.0344/lb. in savings)=**$42,495 in annual savings**

Scenario II: Expand the Current (Separated Stream) Program

Overview

Before outlining possible expansion, I want to project future demand. See table for diversion rates and tonnage of recyclables projected through 2011.

Year	Recyclables (tons)	Diversion rate
2008	632	7.02%
2009	651	7.08%
2010	667	7.13%
2011	682	7.17%
Equation	y=(487.833)x(X^(0.161))	y=(0.0669)x(X^(0.035))

The success or failure of a separated stream program is determined by consumer participation. Many people recycle in order to be "green," but only a segment of the population cares about being "green."

Sitka also offers an economic incentive to recycle. The City's 32-gallon containers allow Sitkans who reduce the volume of their waste stream through reduction, reuse, recycling, and composting to pay less for garbage collection.

Even with an economic incentive, however, Sitka's diversion rate has stalled. My projection shows that Sitka's diversion rate will not change unless the recycling program (separated stream) changes.

What Can be Done

Even if the City keeps its separated stream program, there is room for improvement. I propose three changes:

1. Increase diversion rate through additional incentives. The $42,500 in annual savings generated by recycling is absorbed by the Solid Waste Fund. Basically, recycling subsidizes garbage, if by small measure. Instead, the City should pass on savings generated by recycling back to consumers (perhaps as a rebate listed on the utility bill), creating a direct cause-and-effect relationship between recycling and lower garbage rates. If Sitkans know that recycling lowers their garbage bill, they might recycle more.
2. Create higher-value streams of recyclables. The City should separate its current categories of recyclables — mixed paper, for example — into higher value, more specific streams, such as white office paper. White office paper fetches four times the price of generic mixed paper on the market. The cost of collecting an additional recyclable commodity such as white office paper is singular (and insignificant): add an additional green roll-off container at the Katlian St. recycle center.
3. Improve efficiency. The artificially inflated savings the City enjoys could be substantially reduced in 2010 when the City renegotiates its contract with Rabanco. A few relatively simply modifications to the way the City bales its recyclables could preserve or possibly increase the savings the City enjoys.

Increase diversion rate through additional incentives

If the current savings — $42,500 — were passed onto the consumer, each household and business would see a ~3 percent reduction in its garbage rate. Additionally, as a "carrot," each percentage point increase in the diversion rate (representing an additional $6,500 in savings) would represent a half a percentage point decrease in garbage rates, a direct and understandable cause-and-effect relationship. The cause-and-effect is understandable and could improve awareness of recycling's economic benefit.

On the other hand, the financial rewards of recycling would be distributed to all consumers, regardless of whether they actually recycle.

Separate recyclables into higher value streams
According to Haines Friends of Recycling, the non-profit that manages Haines' recycling program, about 20 percent of all paper received is white office paper. This is separated at the source, the Haines recycling facility.

If Sitka were to separate white office paper and mixed paper, the City would generate an additional $2,537 in annual savings.

> (425,440 lbs. of mixed paper)x(.2)=Projected annual tonnage of mixed office paper=85,088 lbs.
> (85,088 lbs. of mixed office paper)x($0.04275/lb.)=Projected annual revenue from mixed office paper=$3,637
> (85,088 lbs.)x($0.0129/lb.)=Price that that mixed office paper would otherwise fetch as generic mixed paper=$1,098
> ($3,637)-($1,098)=Projected annual net revenue from mixed office paper=$2,537

Improve efficiency
Improving efficiency is the most important possible improvement to the City's recycling program. Improving efficiency also requires the biggest investment and offers the greatest financial reward.

The City pays Rabanco $0.0301/lb. to transport the green roll-off containers from the Katlian St. recycle center to Sawmill Cove, and to bale those recyclables. Rabanco's actual costs may in fact be as high as $0.05/lb. By completely mechanizing the baling process — sending recyclables from the roll-off containers directly into the baler — Rabanco can dramatically improve its efficiency by eliminating the need for the Bobcat, reducing the number of Stragier employee hours required to bale recyclables, and ultimately saving the City money.

After evaluating the City's recycling facility, I recommend the City use a pit conveyor belt. The roll-off containers would be emptied into a hopper, which would funnel the recyclables onto a conveyor belt that would deposit recyclables into the hopper of the baler. This design is similar to what is used at the SMURFIT Recycling Center in Anchorage.

Krause Manufacturing in Bellingham, Washington, quotes $120,000 for a conveyor belt with the approximate specifications required by Sitka's baling facility. Assuming a ~7 percent diversion rate, the improved efficiency of the Sitka's recycling facility would amortize the capital cost of the conveyor-belt system in two to four years.

With a pit conveyer belt system, the City would need to procure additional roll-off containers to store recyclables. These roll-of containers would cost between $20,000 to $40,000, although a number of these containers could probably be acquired for free or leased at a discounted rate from Rabanco as a condition of contract renewal (similar to the City's use of the Selco baler).

Scenario III: Switch to a Curbside Single-Stream Program

Overview

Sitka has an often acknowledged asset in its MSW collection system: Stragier Sanitation's completely automated fleet of garbage trucks. Stragier's automated garbage tracks would be the linchpin of a successful single-stream curbside program, and a successful single-stream curbside program would couple greater consumer convenience with $150,000-$210,000 in annual savings.

Every business and household in Sitka would receive a second refuse container ("garbage can") for every original refuse container. The original refuse container (the garbage can) would be used for garbage. The second would be used for commingled recyclables — a "recycling can." The commingled recyclables constitute a "single stream."

Stragier would collect recyclables every other week and stagger and reduce collection of MSW to every other week. For higher frequency locations such as Lakeside, Sea Mart, SEARHC, the harbors, et al., a combination of more cans or greater capacity cans (depending on available space) and multiple weekly collections would be arranged.

Stragier would deposit the recyclables at the Jarvis St. transfer station into AML container vans for shipment, just as if it were MSW. The container vans would be shipped to Seattle to a materials recovery facility ("MRF") where the commingled recyclables would be separated (using density separators, magnets, and manual labor) and ultimately baled and sold.

A curbside, single-stream program dramatically improve convenience to the consumers, ergo increasing participation and raising the diversion rate. Most municipalities that switch from a separated-stream centralized-deposit system (Sitka's current recycling program), to a curbside single-stream program, quadruple their diversion rate. For Sitka, this would forecast a 30% diversion rate. Sitka could its diversion rate to 50, 60, or even 70 percent as recycling becomes habitual and a cultural expectation.

Anticipated Problems and Possible Solutions

Aluminum

Currently the Baranof Barracuda Swim Club ("BBSC") receives all revenue generated from aluminum. As best the City can estimate (BBSC does not disclose its revenue), BBSC nets between $10,000 and $20,000 annually, which essentially represents a donation to the swim club. With a single-stream curbside program, a vast majority of Sitka's aluminum would be collected by the City and unable to be separated for BBSC.

There are three possibly outcomes:

1. The City could nullify its relationship with BBSC.
2. The City could appropriate $10,000-$20,000 to BBSC, acknowedging BBSC's history of recycling aluminum.
3. The City could leave its two roll-off containers for aluminum at Katlian St. for those who wish direct the proceeds of their aluminum to BBSC.

Bear trash

During bear season, residents can't store trash outside. Storing two weeks of trash inside is a burden and inconvenience.

One possible solution could come in the 3,600 new garbage cans needed to accommodate a single-stream curbside program. These new garbage cans could be furnished with a anti-bear devices while the old refuse containers used for MSW could be used for the less odorous recyclables.

Additionally (or alternatively), a centralized location for bear waste could be provided downtown, possibly at the current Katilian St. recycle center.

Enforcement and education
While some contamination — in this case, MSW — in a single stream of recyclables is inevitable, non-recyclables can be separated at the MRF. Substantial contamination (anywhere from 3 to 10 percent of the stream of recyclables) incurs penalties from the MRF operator.

If Sitka suffers from high levels of contamination, the City will need to educate its residents and, as a last resort, initiate enforcement. The latter would certainly come as a last resort, however. Who wants "garbage cops"?

A deliberate and competent transition to a single-stream program should reduce confusion and the potential of contamination. Enforcement should be infrequent or nonexistent, similar to the City's bear trash ordinance.

Two-week collection schedule
The two-week collection schedule would pose an inconvenience for construction companies and individuals who take their construction debris and MSW directly to the transfer station. The below sample collection schedule would create, at most, a day-and-a-half wait time to directly deliver MSW to the Jarvis St. transfer station. The wait still constitute a disadvantage to a single-stream curbside program.

Day of the week	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Week one	—[1]	MSW	R	R/MSW[2]	MSW	R	MSW
Week two	—	MSW	R	R/MSW	MSW	R	MSW

Notes:
1) Stragier Sanitation does not currently operate on Sunday.
2) The transfer station would switch from receiving recyclables to receiving MSW in the middle of the day.

It would be possible, however, to construct a second loading dock at the Jarvis St. transfer station for exclusive use for recyclables and thus obviating the need to switch the transfer station from MSW to recyclables. A second loading dock at the Jarvis St. transfer station would dramatically improve the logistics of a single-stream curbside recycling program.

It is worth noting that the diversion rate only considers the mass of recyclables, not density. MSW is more dense than recyclables. Consumers who separate out recyclables from MSW should experience, on average, a 50 to 70 percent reduction in volume in their garbage cans.

Density
The low density of recyclables is an important consideration for shipping. The average density of MSW shipped south by the City in container vans is 0.579 lbs./cubic yard. Unbaled, uncompacted recyclables — which is what the City would be shipping with a

single-stream curbside recycling program — could range anywhere from 0.1 to 0.25 lbs./ cubic yard. While the City's contract with Rabanco assesses shipping charges on a per pound basis, the lower density of recyclables and, consequently, the increased number of container vans required to ship recyclables might prompt Rabanco to either introduce a per container handling fee or charge more per pound for shipping.

Just as the City would ship comparatively low-density recyclables, the density of Sitka's MSW would likely increase by a commensurate degree (because low-density recyclables would be removed from the MSW), to anywhere between 0.6 to 0.75 lbs./cubic yard. The City pays to ship MSW on a per pound basis, so under the current contract an increased density of MSW would not produce any financial benefits, but in future contract negotiations it should be important to note that a high per pound shipping rate for recyclables should accompany a decrease in the per pound shipping rate for MSW.

Insufficient space for multiple containers
In high density areas, especially the central business district, doubling or increasing the number of refuse/recycling containers would be difficult or impossible.

These locations would need to be handled on a case-by-case basis, a customized collection schedule crafted to balance the demand and volume of refuse and recyclables and the conservation of space.

Costs

Service	**Contractor/provider[1]**	**Price (per pound)**
Collection	Stragier	$0.0[2]
Processing (Jarvis St. transfer station)	Stragier	$0.015[3]
Shipping	AML, Northland, Samson	$0.03-$0.05[4]
Processing (MRF)	Rabanco, et al.	$0.015[5]
Coordination	Community Schools	$0.0063[6]
Advertising	City and Borough of Sitka	$0.0008[6]
Comprehensive cost of recycling	**All of the above**	**$0.0671-$0.0871**

Notes:
1) Contracts would have to be put out to bid, but these are the companies and organizations that appear best suited for each role based on their past relationship with the City and their infrastructure and resources.
2) As a curbside recycling program would be built into Stragier's existing infrastructure and would modify, not augment, its collection schedule, no additional reimbursement should be needed.
3) $0.0015 is more than Stragier currently charges to operate the Jarvis St. transfer station for MSW. This additional cost is rationalized by the operational expense of switching from MSW to recyclables three times a week.
4) This figure, out of any in this projection, is the most variable. Because of the substantially decreased density of uncompacted, unbaled recyclables, $0.0012 was added to the low end of the projection on top of what the City currently pays for shipment of recyclables. However, as the shipment of recyclables would create a unique set of demands on the shipping company, therefore the per pound cost of shipping could very well be a full cent or two higher higher than what the City currently pays.
5) This figure is based from the City of Seattle's contract with Rabanco for processing the City's commingled single-stream recyclables. The City of Seattle pays $0.0135/lb. An additional $0.0015 is added to that figure as the City and Borough of Sitka would not produce a comparable volume of waste (i.e., economy of scale), therefore would not likely be able to negotiate as competitive a contract.

There is a substantial caveat to the price of processing at a MRF, however: Rabanco sells all the recyclables and keeps the additional revenue. That is why the price is so low. More specifically, in Seattle's contract there are "base commodity prices" stated. If Rabanco is able to sell the recyclables at prices *exceeding* those "base commodity prices" – if the price for plastics suddenly doubled, for example – that windfall, that margin between the actual prices and the "base commodity price" stated in the contract, goes to the City of Seattle. Conversely, if the actual prices for recyclables *depreciated* from the "base commodity prices," the City of Seattle would be financially obligated to reimburse Rabanco for the shortfall. Essentially, it passes off the risk *and* reward of the market to the City, akin to the City's current contract with Rabanco.
6) The per pound costs for coordination and advertising are lower than current rates because coordination and advertising are a flat contract and cost, respectively, and are both divided by the tonnage of recyclables. Under Scenario III, the tonnage is calculated upon a 30 percent diversion rate instead of a 6.9 percent diversion rate, therefore the price is fourfold cheaper.

As revenue from recyclables has already been accounted for (see note 5 above), the savings can be readily calculated.

Comprehensive cost of MSW	$0.1033/lb.
Comprehensive cost of recycling	$0.0671-$0.0871/lb.
Net savings generated by recycling	**$0.0162-$0.0362/lb.**

Multiplied by 30 percent of the total volume of waste handled in the calendar year of 2007 (i.e., diversion rate), total projected annual savings are calculated:

(5,729,060 projected pounds of recyclables)x($0.0162-$0.0362/lb. in savings)=**$92,810-$207,391 in annual savings**

Future savings
This scenario is constructed on a 30 percent diversion rate, a conservative premise which could almost certainly be increased by double digits just a few years after implementation creating additional savings. See table for projected savings with increased diversion rates.

Diversion rate	**Annual savings**
30%	$92,810-$207,391
35%	$108,282-$241,963
40%	$123,751-$276,529
45%	$139,219-$311,095
50%	$154,688-$345,661
55%	$170,157-$380,228
60%	$185,820-$414,782
65%	$201,095-$449,360
70%	$216,564-$483,926
75%	$232,032-$518,492

For comparison, New York City's self-reported city-wide diversion rate is 16.5%; the State of Maryland (average) is 45%; Niagara, New York, 46%; the State of Tennessee (average), 49%; the State of California (average), 52%; Hartford County, Connecticut, 57%; Santa Monica, California, 67%; San Francisco, 70%.

If the savings from recycling were passed onto consumers, Sitka would likely have one of the lowest garbage rates in the state. Passing savings onto the consumer would also

establish a cause-and-effect relationship between recycling and a lower garbage rate. Doing so might encourage the Sitkans to recycle.

Capital costs
The largest (and singular) capital cost of a single-stream curbside program would be the acqusition of an additional refuse container for every household and business in Sitka, about 3,600 in all. That expense would be roughly $300,000-$350,000 based upon quotes from Rehrig Pacific and Michael Brothers, the two refuse container manufacturers that Stragier currently purchases from.

This expenditure could possibly be funded through grant funding from the Denali Commission, among other sources, although, if grant funding is not available the price would be amortized in two to four years.

Conclusion

Recommendation
I strongly recommend the City adopt Scenario III, a single-stream curbside program. Scenario III is the most environmentally friendly, most convenient to the consumer, and most financially beneficial to the City and to Sitkans.

There are possible disadvantages to Scenario III that would exist even after the successful implementation of a curbside single string program, but these disadvantages would be outweighed by the benefits a single-stream curbside program would bring to Sitkans.

Scenario III would also be the first curbside single-stream program in the State of Alaska, giving Sitka status as a progressive and entrepreneurial community.

Secondary Considerations
There are two principal secondary issues to consider in Sitka's recycling future.

Use of biomass
There has been local interest in using biomass — cardboard and newsprint — for energy by burning it in a pellitized or brick form. This biomass, once collected by Stragier in Scenario III, would be near impossible to separate out. In Scenarios I and II, however, as the biomass is already separated it would be easily accessible for local entrepreneurs to process and sell it.

In the hierarchy of waste, reuse trumps recycling, and the lower energy costs for Sitkans that biomass may provide is an impact worthy of consideration. However, a substantial percentage of biomass — 500 tons or more annually — can likely be captured by forging partnerships with the largest local biomass producers: Sea Mart, Lakeside, True Value, Spenard's, The Sitka Sentinel, etc.

A regional MRF
The legislature recently authorized a Southeast Alaska Regional Solid Waste Authority. As other Southeast communities move towards recycling, an economy of scale may encourage the construction of a regional MRF, likely to be build on Prince of Wales Island and under the auspieces of the Regional Solid Waste Authority. As shipping costs would be the highest single cost of a curbside single-stream program, a regional MRF would likely reduce the cost

of shipping and further improve the economics of recycling.

The same takeaway applies to the planned development of the Port of Prince Rupert and improvements to the Grand Trunk Pacific Railway, providing access to MRFs in Prince George, British Columbia, and Edmonton, Alberta.