On October 16, 2000 the Department of Public Works provided the Board of Mayor and Alderman (BMA) a presentation on the status of the City of Kingsport's recycling programs. The year 2000 marked the 10 year anniversary of City recycling services so it seemed an appropriate time to review the performance of recycling over the first decade.

Opening Remarks

At both the national and local level recycling was one of the true environmental success stories of the 1990s. Recycling began the decade as the work of a few well organized Boy Scout paper drives but 10 years later – as a direct result new federal and state regulations – recycling had become one of the most popular services offered by local governments in over 2,000 cities nationwide.

In our home state of Tennessee Governor Sundquist declared October **"Tennessee Recycles Month"** and he issued a personal challenge to everyone in Tennessee to do at least one thing to increase recycling in October.

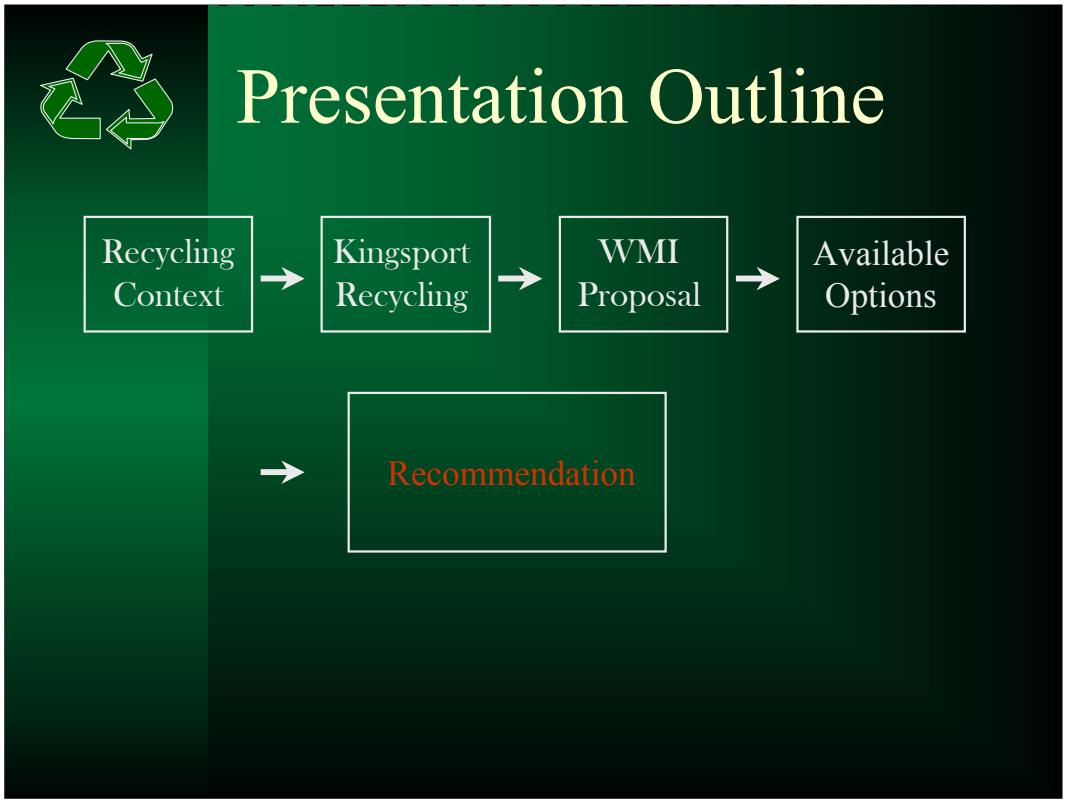
Values of Recycling

In bringing recycling to Kingsport's front curbs each week, City residents were given a tangible way to contribute towards preserving and protecting their environment. In this way, recycling tapped into a civic environmental ethic that makes each newspaper, glass bottle and aluminum can a symbol of the opportunities each of us have every day to protect our valued natural resources and secure a positive environmental legacy for future generations.

Although recycling is most often touted for its environmental achievements, it is also a City service that competes for limited public funding so it also has to satisfy the other key public service measures of efficiency, effectiveness, and customer friendliness. In managing the recycling services, the Public Works Department has worked hard to contain costs, improve productivity and optimize recycling operations with a constant eye on bottom line performance.

Unfunded Mandates

Unfunded federal and state mandates like recycling exert pressure at the local level to work harder and smarter, continually pushing operations to do more with less. As a result, there is a constant struggle to balance the issues of convenient, customer friendly services versus low cost services. The issue becomes a policy decision about where to draw the line between affordability of the levels of service desired vs. the level of service required. This issue is considered every year as annual budgets are prepared.



Presentation Preview

This presentation provides a review of the performance indicators that relate to recycling's first ten years in Kingsport. In it you will see how we measure our inputs and quantify outputs. And more to the point, we will assign a dollar amount to the service rendered.

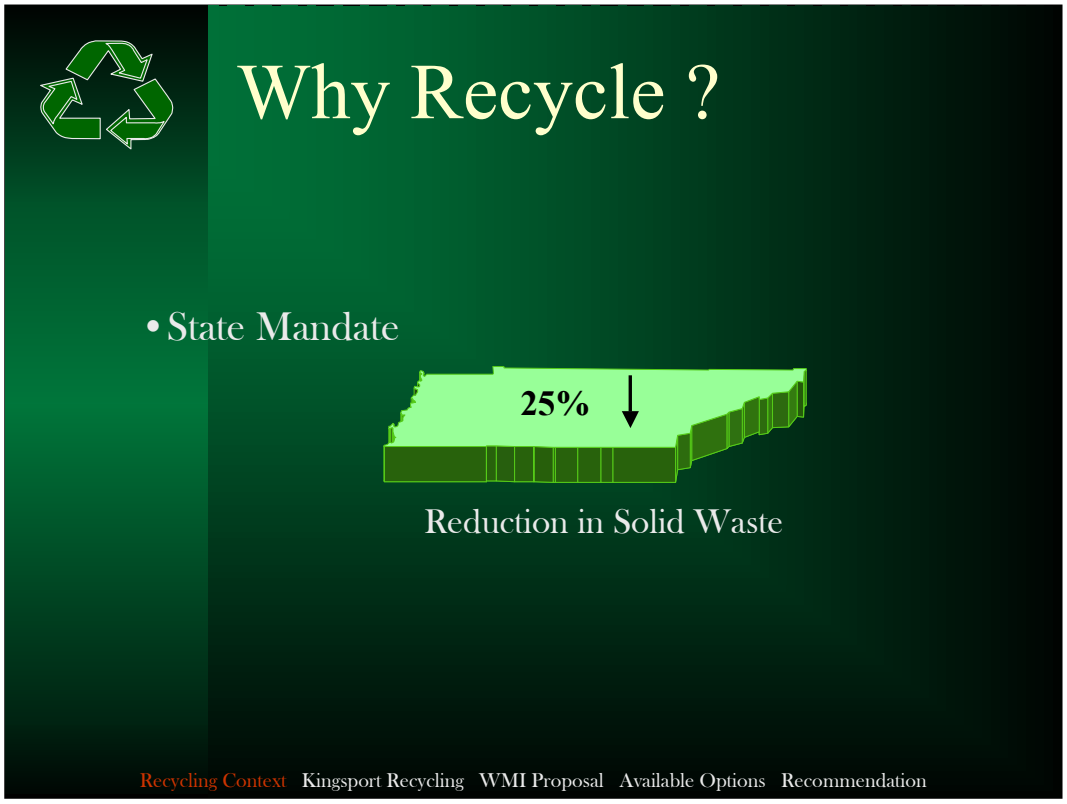
We are proud of the competitive nature of our cost. At $1.70 / month, we think it is one of the best deals in town. And we intend to keep it that way.

In the end, we hope to demonstrate that as important as costs are to our recycling operations, costs by themselves do not necessarily equal to value -- value is greater than the sum of the costs. The value of the service reflects elements that often defy measure, e.g. quality of life, environmental legacy, etc. But what is hard to measure is not necessarily hard to see when you look at the differences between a City that is on the path of improvement versus one that is on a descending spiral and has lost the delicate balance between staying out in front of its problems and being buried beneath them. Recycling has become a hallmark of communities working to better their future.

The image of the Garbage Barge floating from port to port looking for a final resting place in the 1980s was a fitting end to the belief that trash can be kept out of sight and out of mind that cultivated the nation's historical dependency on landfills.

By the end of the 1980s the Federal government had made it a national priority to reduce the nation's dependency on landfills and to that end the Environmental Protection Agency (EPA) introduced new regulations that dramatically increased the costs of operating landfills. With new requirements for daily cover, leachate collection, methane collection and liner systems 70% of the nation's landfills closed their front gates and shut down for good.

This consolidation in the waste disposal industry led to a landfill capacity shortage and drove more and more communities to look to recycling as a way to minimize their landfill costs.



New Recycling Laws

Coinciding with the passage of stricter landfill regulations the Federal government also issued a new 25% recycling goal that each state was required to achieve. States like Tennessee adopted the 25% goal and passed the responsibility of reaching this goal on to cities, counties and towns. Failure to achieve the recycling goals could lead to civil fines and could jeopardize the status of certain permits and/or state funding.

Conservation and Environmental Benefits

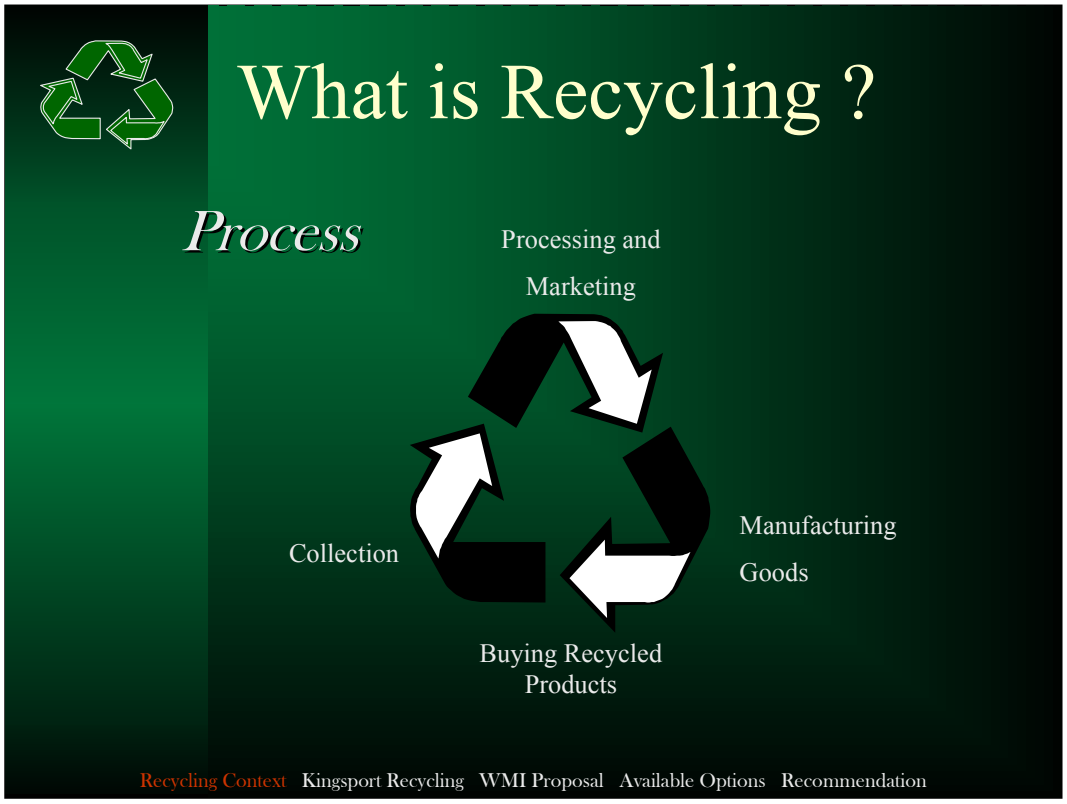
The basic premise of recycling is fairly simple – its always better to re-use something than to throw it out and bury it in the ground. This conservation ethic was deeply ingrained in the nation's past and for early farmers and settlers it was a matter of necessity. But today with the proliferation of consumer products the re-use philosophy has given way to disposable products and a throw-away philosophy.

From this perspective, recycling is a new twist on an old idea. Recycling asks people to make the choice to try to conserve the finite natural resources that go into our consumer products, e.g., wood for paper, oil for plastics, silica for glass and aluminum for cans. The sole use of virgin materials for consumer goods has economic and environmental implications and most of these natural resources are not easily replaced and may some day be used up.

Furthermore, with large numbers of old dumps listed as contaminated sites that threaten ground water supplies, wildlife and public health it is clear that just burying things in the ground is not a sound approach to managing wastes.

Civic Support

From creek clean-ups to paper drives, recycling has also been a very visible expression of civic responsibility. Civic organizations and non-profit groups have used recycling for years as a means to draw attention to environmental awareness and conservation efforts. Recycling continues to be one of the most popular City services.



Recycling Process

Recycling is not a single point in time that exists just at your curb. Rather, as the chasing arrows suggest, recycling is a process that begins with the decision of the homeowner to place their recyclables in their recycling bin (rather than their trash can) and then set the bin out for collection by the City. From there, the City delivers the recyclables to a "materials recovery facility" where the materials are sorted and prepared for use as a feedstock for the manufacturing of new products. The full cycle of recycling remains incomplete until these new products – that contain varying percentages of recycled content – re-enter the consumer market and are purchased again for use.

Recycling Partnership

The City recognized early on that given the complexity and volatility of secondary material markets it was critical to design a recycling program that capitalized on the City's strength – which in this case was collection services – and to outsource the non-traditional government services of materials processing and marketing to private industry experts with specialization in these areas. In this manner, a partnership between the City of Kingsport and Waste Management Inc. was born.

City Curbside Collection

The City began curbside recycling in 1991. The City's recycling customers were provided 18 gallon blue recycling bins for weekly collection of aluminum, steel and bi-metal cans, newspapers, three colors of glass bottles and two types of plastic containers (PET #1, HDPE #2). The curbside service was designed to emphasize convenience in order to pull participation rates up as high as possible and to maximize the tonnage of materials collected. With that in mind, the City does not require residents to do any separation of materials in their bin (it can all be co-mingled) and collections occur weekly on the same day as their regular garbage collection.

In 2001 the City added magazines, catalogues, colored paper, telephone books and office paper to the list of acceptable recyclable items.

Recycling Processing

Waste Management Inc. has been under contract with the City of Kingsport since 1991 to sort, process and market the recyclable items delivered by the City. With $11 billion in annual sales Waste Management Inc. is the largest waste company in the country and the company's international presence and trade expertise provides a competitive marketing advantage since most recyclables are actually sold in global markets.

For example the #1 and #2 exports out of the United States are waste paper and scrap metal respectively. And the scrap paper that we collect is routinely shipped overseas to places like southeast Asia where they are recycled into cardboard boxes that are then used for packaging the consumer electronics products that are in turn sold back here in the US.

Re-sale of Recycled Materials

With strict production specifications and automated assembly lines, manufacturers were originally reluctant to convert their manufacturing operations to include recycled feedstock as a substitute for virgin materials. The need for consistent, high quality feedstock in manufacturing put great pressure on recycling suppliers to develop state-of-the art materials separation and cleaning technologies.

To make matters worse, manufacturers (like paper mills) that wanted to make the change to use recycled feedstock had to re-design their operations and invest 100's of million of dollars to change their technologies to accommodate the different demands associated with recycled feedstock.

From a business perspective the recycled feedstock also had to compete with the prices of virgin feedstock and depending upon particular economic cycles it was not unusual for virgin prices to fall below recycled prices. As a result, manufacturers were under pressure from environmental groups and industry associations to move towards increasing their use of a recycled feedstock that was more expensive, less reliable (quality) and required re-engineering production lines without sacrificing their market position.

Recognizing these obstacles in manufacturing, federal and state governments worked with industry associations to develop tax incentive packages and voluntary recycled material content targets that manufacturers agreed to try to achieve in their production lines. The threat of federal legislation mandating certain levels of recycled content in products provided added incentive for the industry associations

In January 1990 the City of Kingsport BMA directed staff in Public Works to prepare a report that evaluated the recycling options available to the City and to develop a recommendation for implementation of a citywide recycling service. The report findings were presented to the BMA on March 19, 1990 and staff received BMA approval to proceed with the curbside service plan outlined in the report. The new curbside service was officially introduced to City residents in May 1991.

These three quotes lifted directly from the 1990 report capture the prevailing themes that best characterize the first 10 years of recycling operations.

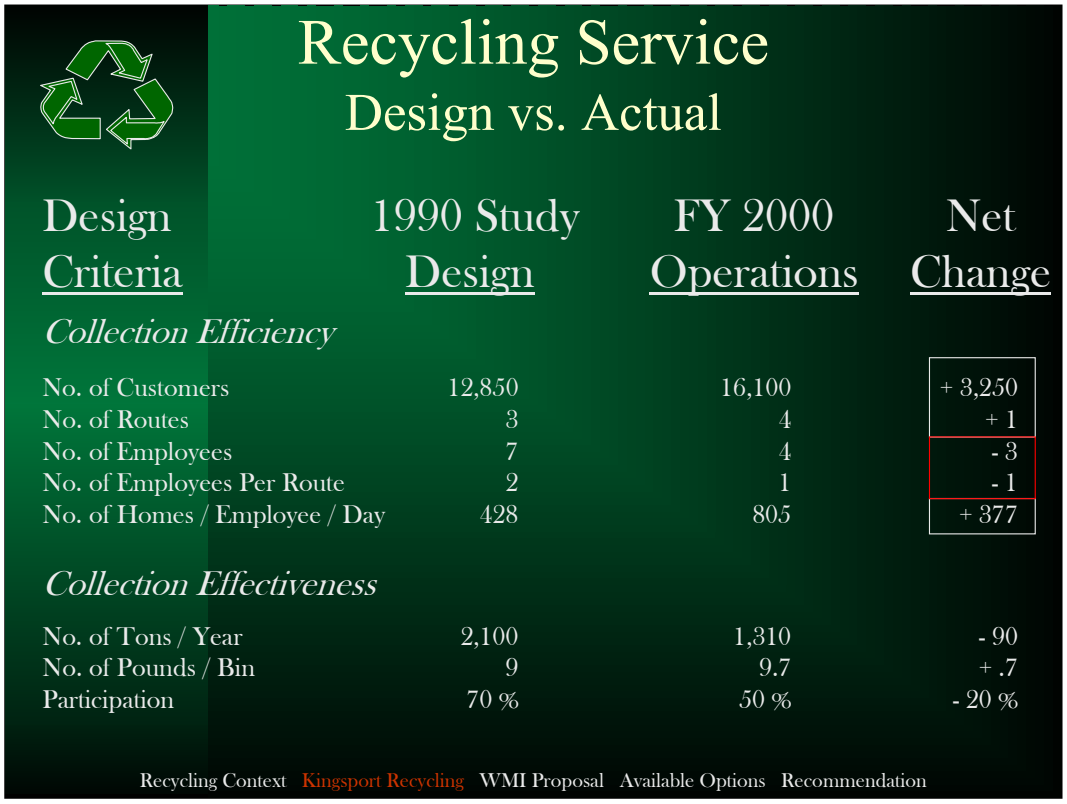
"There are times when recycling may save money; at other times it may cost money."

The original report was very clear that recycling is a new service that will cost money, and while it may save money (landfill disposal savings) it is never going to pay for itself. Unfortunately, because recycling has historically generated some offsetting revenue in the resale of the materials collected, there is a tendency to apply a different standard to recycling that expects recycling to pay for itself. At best these revenues have covered 15-25% of the total costs of the service.

"You can have all of the trucks in the world, but if you don't have markets, you don't have recycling."

Volatile markets have plagued the stability of the economics of recycling and market prices have experienced

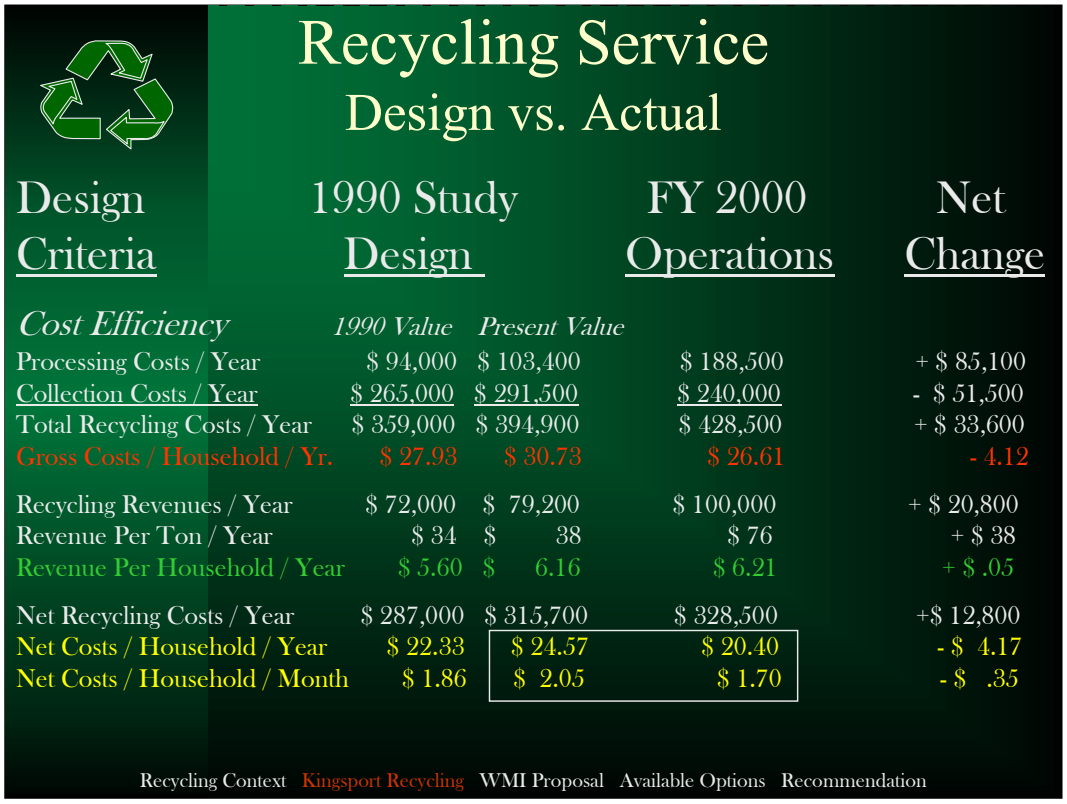
As noted in the previous slide, the City's recycling service is built on a partnership with Waste Management Inc. The partnership is designed to leverage the strengths of public sector collection expertise with private sector marketing experience.



Operations Performance

In comparing the original service parameters approved by the BMA in 1990 with actual FY2000 operations it is clear that the City's crews have been doing more with less in the last 10 years. The City recycling operations serve 25% more households than originally planned with 43% less staffing.

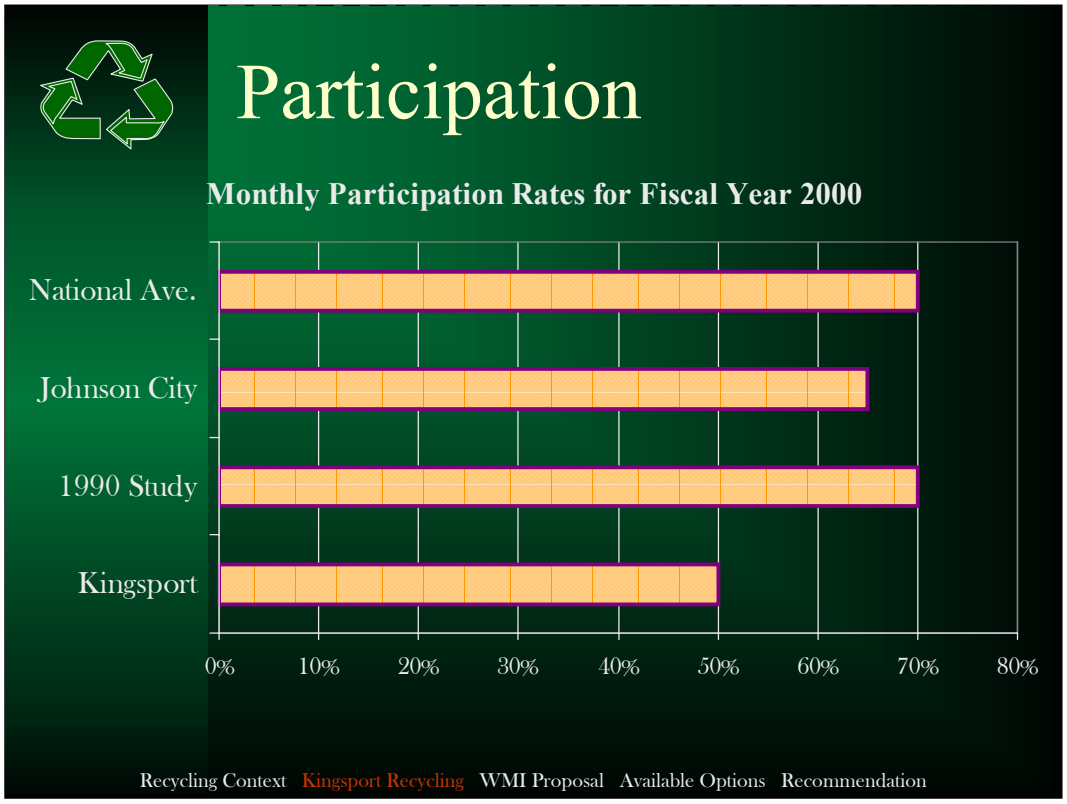
However, from an effectiveness perspective, the service has been less successful as nearly 20% fewer residents participate than originally planned. This reflects the fact that recycling is a "co-produced" service that depends upon residents' participation in order to optimize the use of the equipment and crews.



Economic Performance

The actual costs of recycling services per household are 17% lower than anticipated in the 1990 study. This improvement in the bottom line is largely a measure of better than anticipated revenues and more homes included in the service area which distributes the costs over more customers and thereby lessons the cost burden on any single homeowner.

The principle measures of recycling performance include: participation, tonnage collected, costs, revenues and net costs.

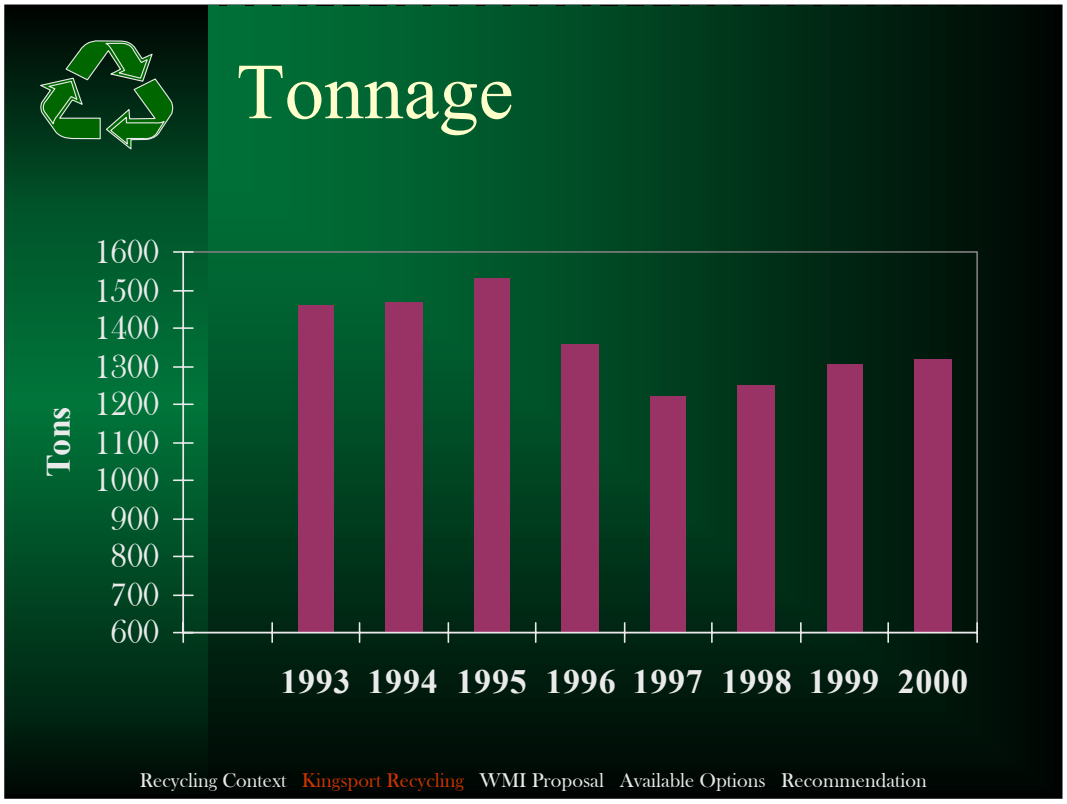


As noted in Slide 13 the bottom line performance of recycling is impacted by the amount of participation – both in terms of number of homes and the amount of material set out by each home each week.

Measuring participation is difficult but based on periodic random counts the City's monthly participation rate has been approximately 50%. Nationwide monthly participation rates average 70% with weekly set out rates between 40-60%. Kingsport's participation rate is below the top performing programs nationally and even regionally which suggests that this is an area for improvement.

Research abounds on the intrinsic and extrinsic factors affecting a person's decision to recycle or not but the greatest influences remain customer convenience and public awareness.

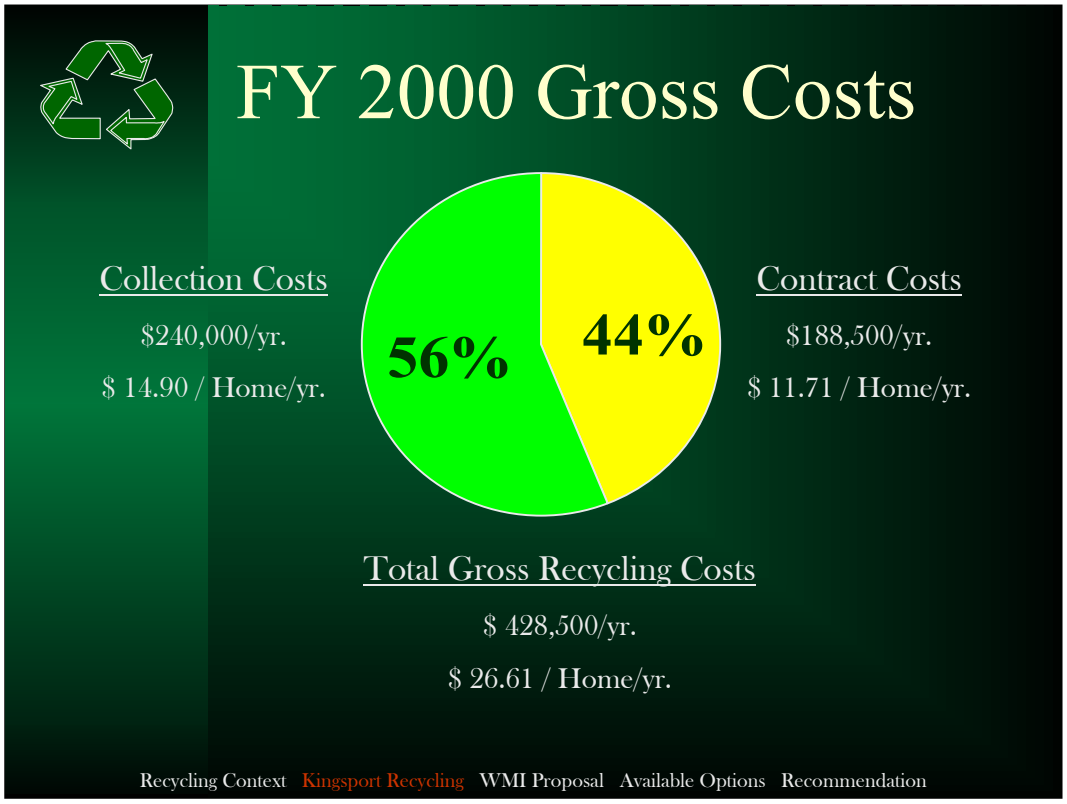
In benchmarking "best practices" it was noted that participation rates were highest in cities that employed aggressive marketing and education programs, established measurable local recycling goals and charged residents directly for trash collection with incentives for recycling. None of these tactics are currently used in Kingsport.



Tonnage represents a measure of the recyclables "diverted" from the landfill. The tonnage is directly related to participation rates and the range of materials accepted in the recycling service. In other words, the more homes that participate -- the higher the tonnage, and the more materials that the City can accept in the recycling bins -- the higher the likely tonnage.

Over the last 10 years the City's recycling tonnage has averaged 1,310 tons/year or 162 lbs./household/year. Of this tonnage, newspaper represents 67%, glass 21%, aluminum and steel cans 6% and plastics 6%. These figures are consistent with national and regional trends.

The decline over time of the amount of recyclables collected each year is also consistent with national trends as communities struggle to keep awareness and enthusiasm high for the service once the novelty has worn off.

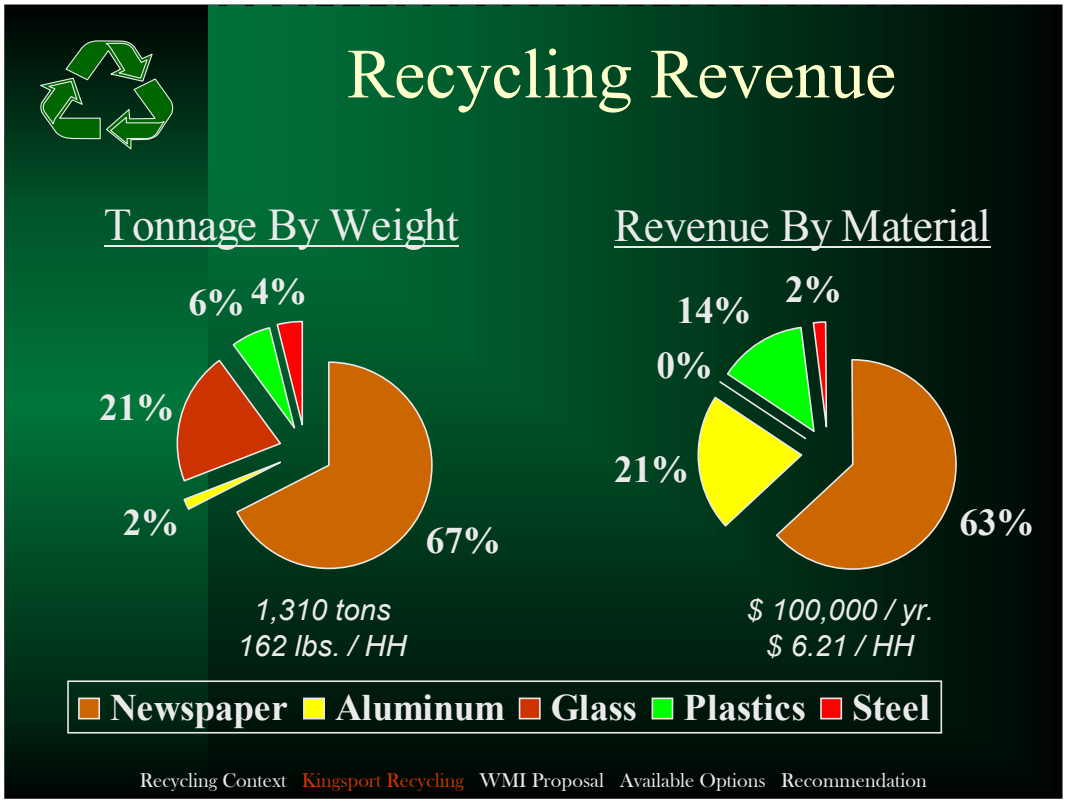


On the cost side of the ledger there are two cost categories: 1)City collection costs and 2)contract (with Waste Management) costs.

City collection costs account for 56% of the total gross costs. Of City collection costs 63% are personnel related and 37% are nonpersonnel costs related to materials, supplies and equipment.

The contract costs account for 44% of the total gross costs. Over the last 10 years the contract costs have risen from $156,000/year to $188,500/year – which represents an average rate of increase of 2-3% which is consistent with inflation.

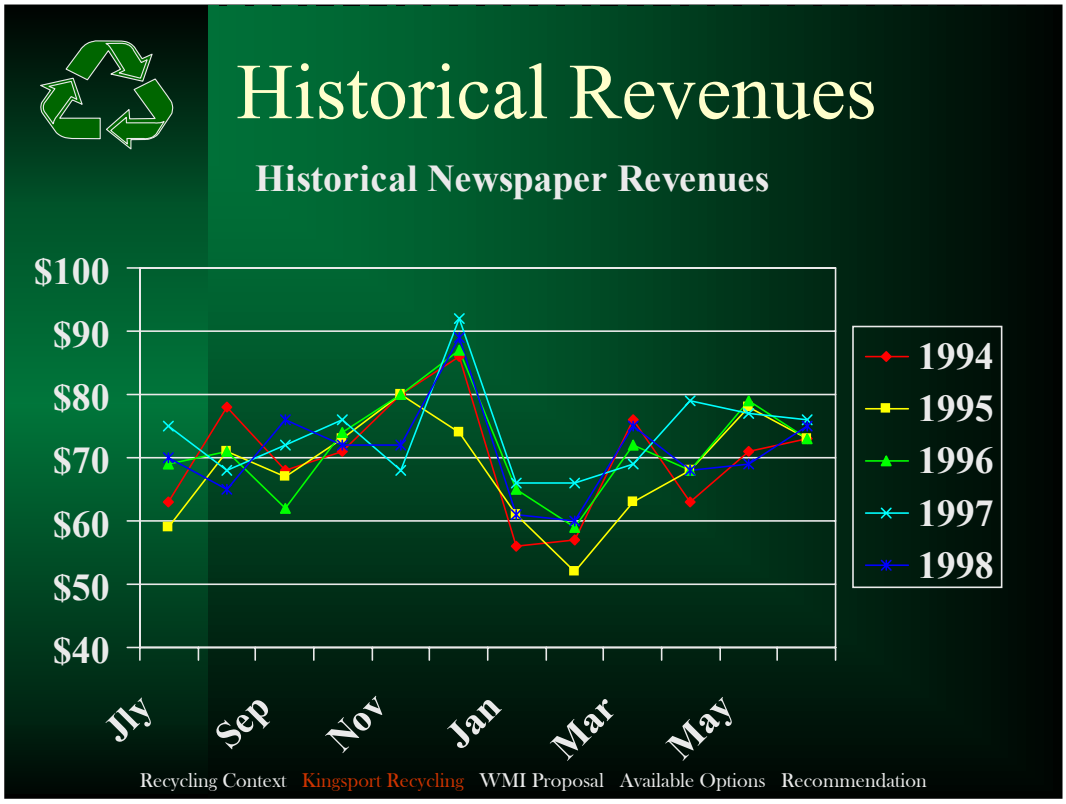
*these are all “gross” costs before any recycling revenues are applied back to the service cost.



Since recycling does produce some revenue, the true "net cost" must reflect the revenue offset.

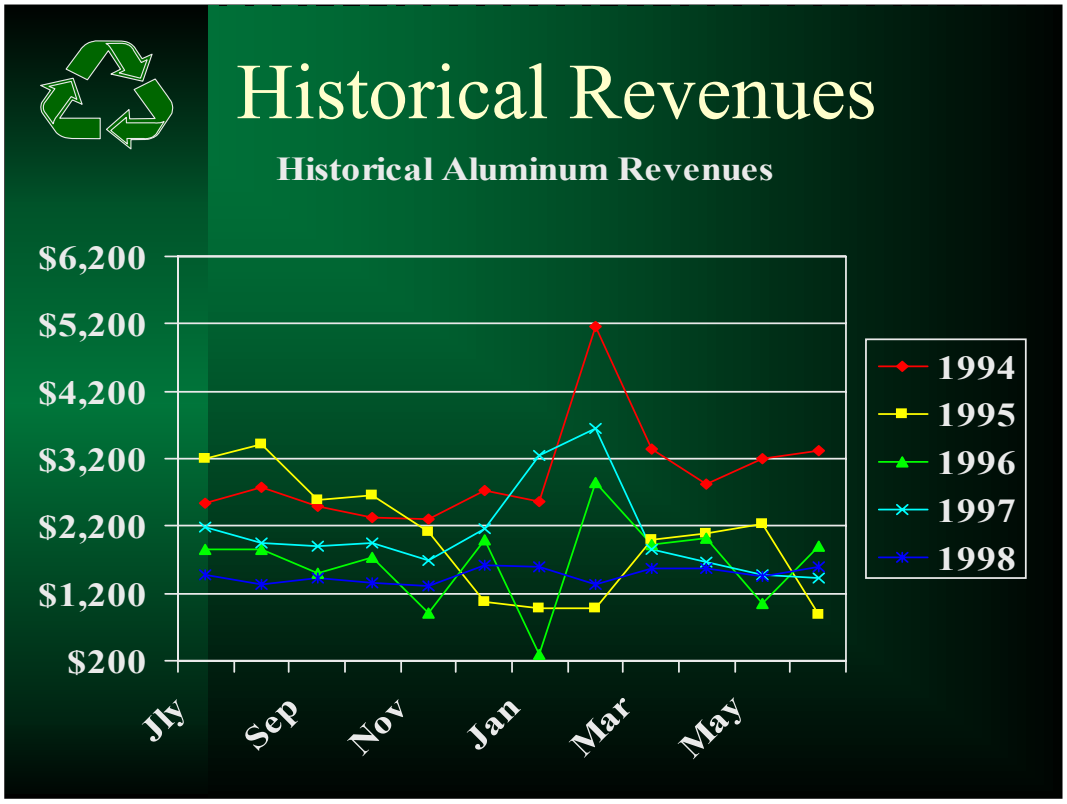
Over the last 5 years the revenues for the sale of recyclables have averaged $87,000/year. These revenues offset approximately 23% of the annualized recycling service costs.

After revenue offsets, the total program costs range between $300,000 and $330,000 depending upon final revenues in a given year.

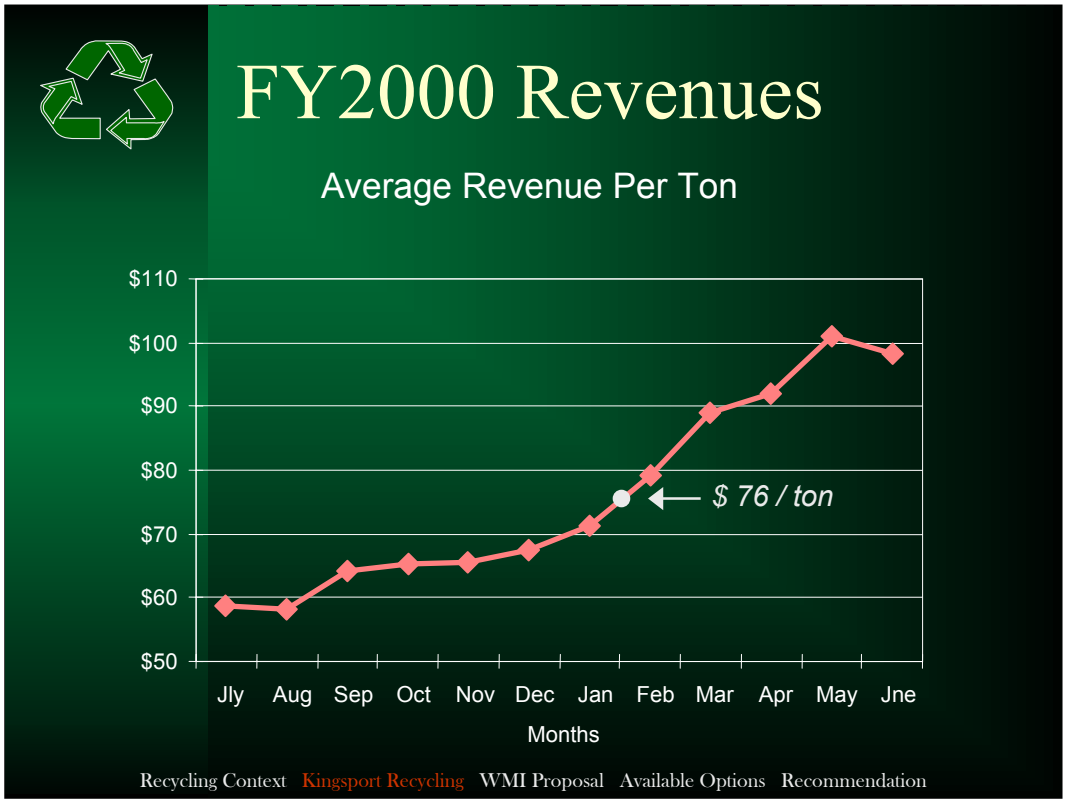


This chart tracks the volatility of the newspaper market over the last 6 years and within each year from month to month. Within this timeframe newspaper reached a low of $52/ton and a high of $92/ton.

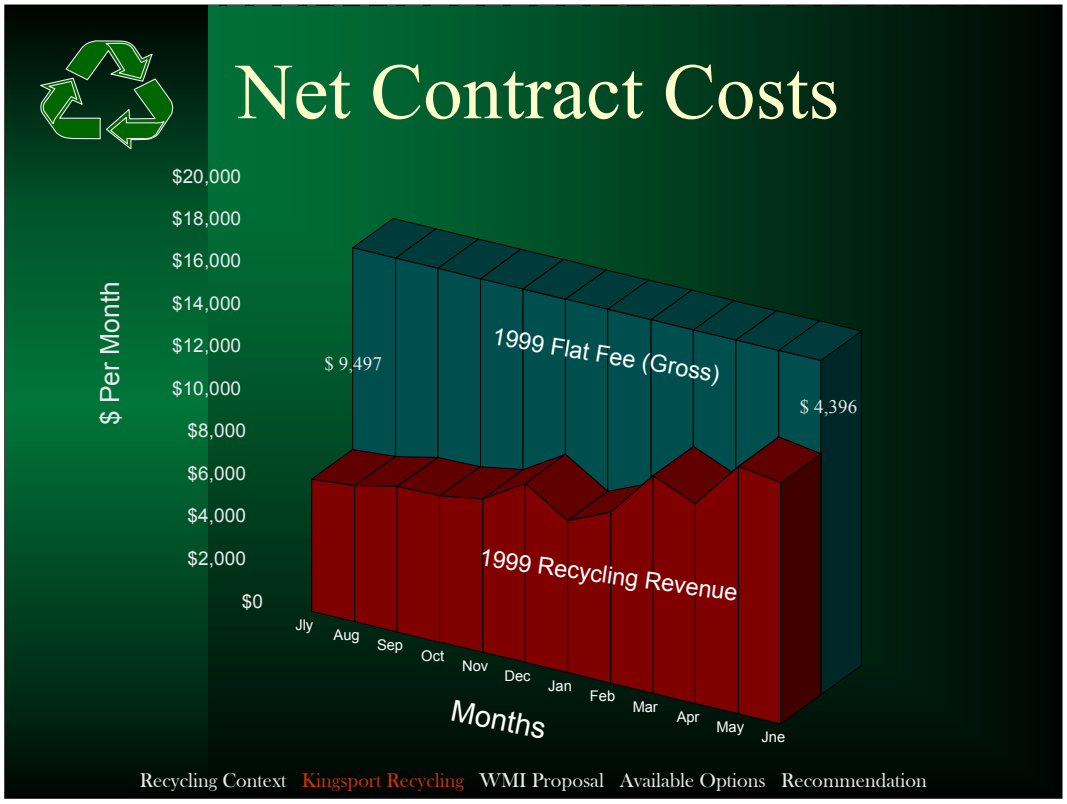
With costs essentially flat, revenues become the principle driver for the bottom line performance of the recycling service. So in those months with good revenues recycling had a favorable bottom line and likewise during low periods the fiscal indicators for recycling were poor. In either case, the City had little means to effect the economic performance of the service as revenues ultimately depend upon: 1)the amount of materials collected (which is a function of how much residents participate) and 2)the value of the material in the re-sale market (which is dependent upon overall economic trade conditions).



This chart tracks the volatility of the aluminum market over the last 6 years and within each year from month to month. Within this timeframe newspaper reached a low of $200/ton and a high of $5,200/ton. Again, the significant swings in market prices demonstrate the dramatic impacts that macro-economic conditions can have on the economic performance of the City's recycling service.



The average revenue per ton for all of the materials collected in the City's recycling service is $76/ton.



This chart reiterates the impact that revenue swings can have on the net contract costs (does not include the City's collection costs).

The Waste Management contract is set up with a flat monthly fee for an unlimited amount of tonnage delivered by the City. As a result, there is an economic incentive for the City to try to deliver as much tonnage as possible since all of the revenues generated in a month are used to offset the flat rate fee of Waste Management.

In the chart above the dark green boxes illustrate the monthly flat fee and the red boxes show the revenues generated each month. The difference between the top of the red and green boxes is the amount that the City actually had to pay Waste Management. When revenues are up (either through strong markets or higher volumes of materials) the City's bill is less and the cost of the recycling service is less. For example, the bottom line of recycling was 53% better in June due to higher revenues than in July.

In summary, the net recycling costs in 2000 were $1.70 per household per month. That is a very competitive rate with private industry and other cities. By comparison garbage collection is approximately $9 - $10/household/year.

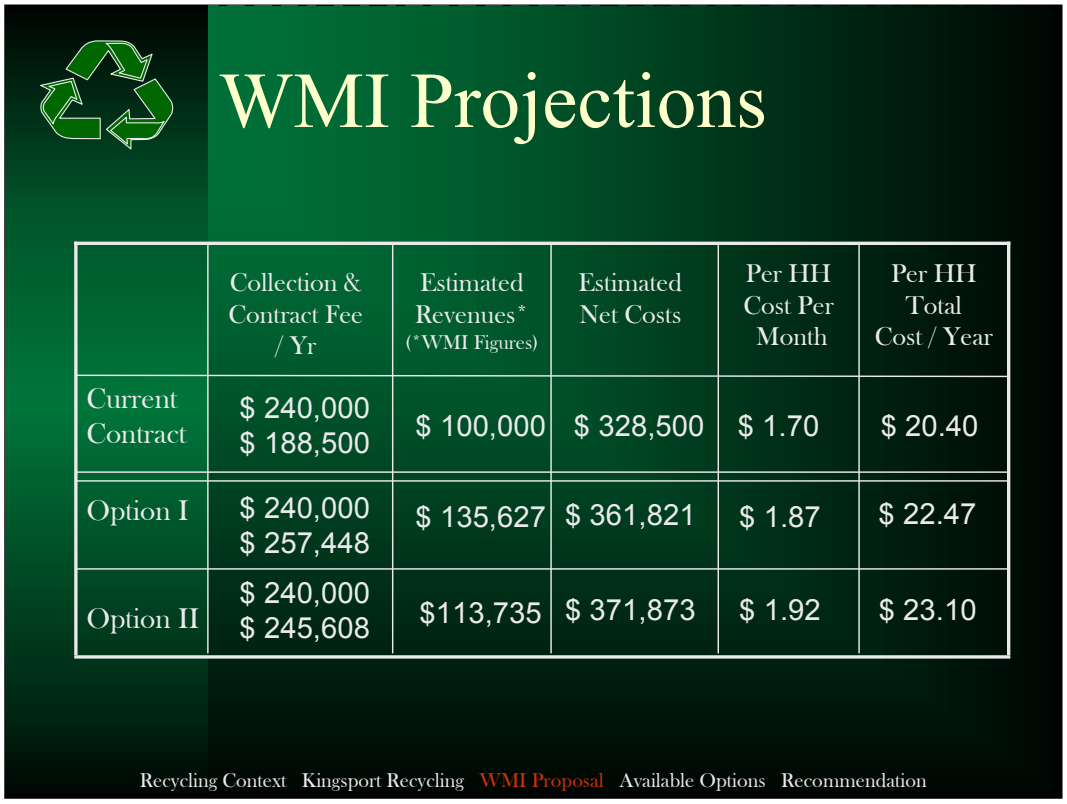
In the April 2000 Waste Management Inc. requested that the City's monthly contract fee be re-negotiated to reflect the increasing costs of their operations. In justifying their request WMI officials noted that their labor and transportation continued to rise at a time when the overall volume of recyclables delivered to the plant had declined. They noted that these economic conditions had seriously impacted their ability to cover their fixed asset costs (building, equipment) without sacrificing their profit margin.

The Waste Management officials offered the City two new contract options.

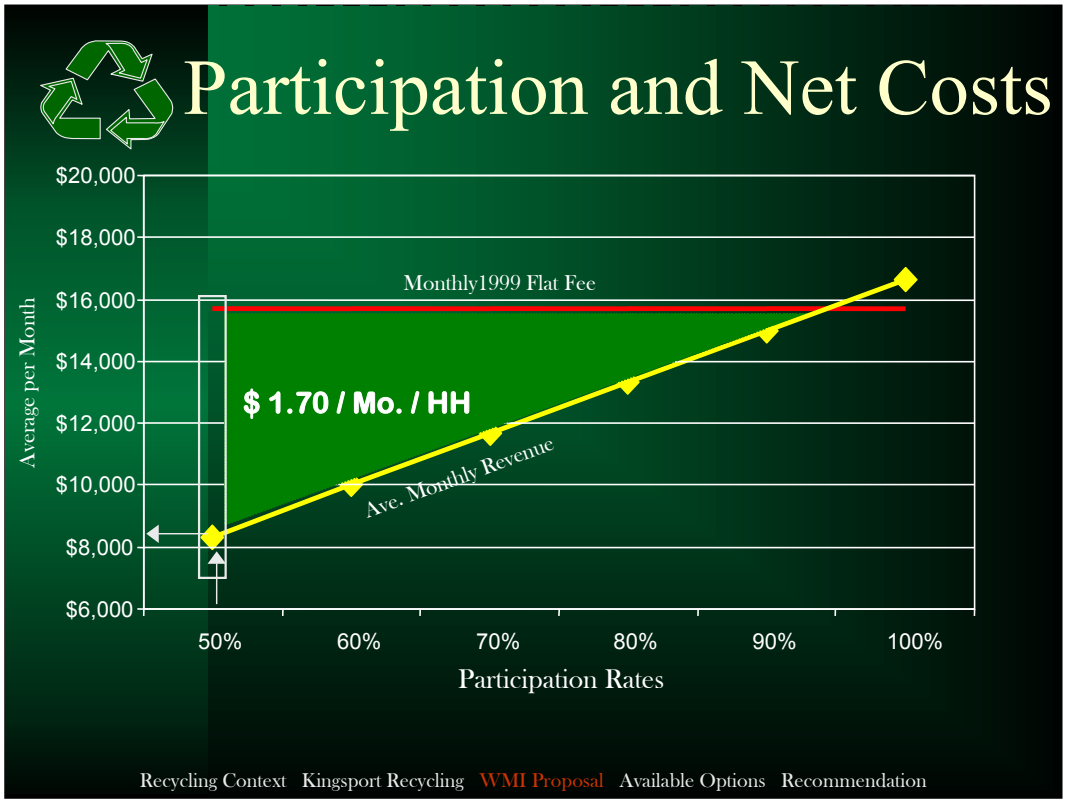
1) Option 1 - in order to better optimize their investment and reduce idle plant capacity, WMI proposed to expand the materials accepted for recycling to include mixed paper, e.g., junk mail, magazines, office paper, etc. Under this expanded materials options WMI proposed an increase of approximately $70,000 / year in the gross costs to the City. However, once the additional revenues generated from the new paper was deducted the final costs were projected to be between $25,000 to $50,000 / year or $2 - $4/household per year.

2) Option 2 - Under Option 2, WMI proposed to maintain the current materials only but increase the City's costs by approximately $60,000/year or $2.70/household/year.

advised the City that it needed to amend its contract cost structure.

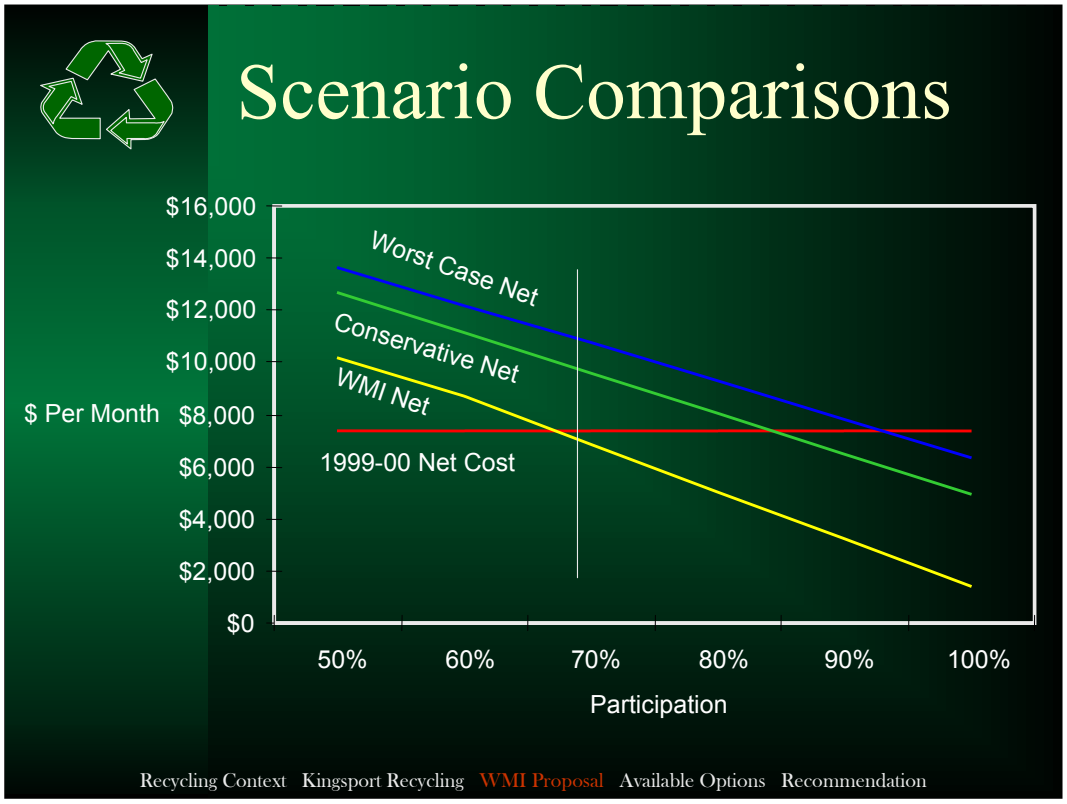


Each of the options presented by WMI had fiscal impacts. The information in the chart above was submitted by WMI as their estimation of likely fiscal impacts. This information was important because the City's final costs are calculated on the formula of Flat Fee – Revenues = City Cost. With this in mind, WMI proposed to increase the Flat Fee but suggested that new Revenues could offset much of the increase under Option 1.



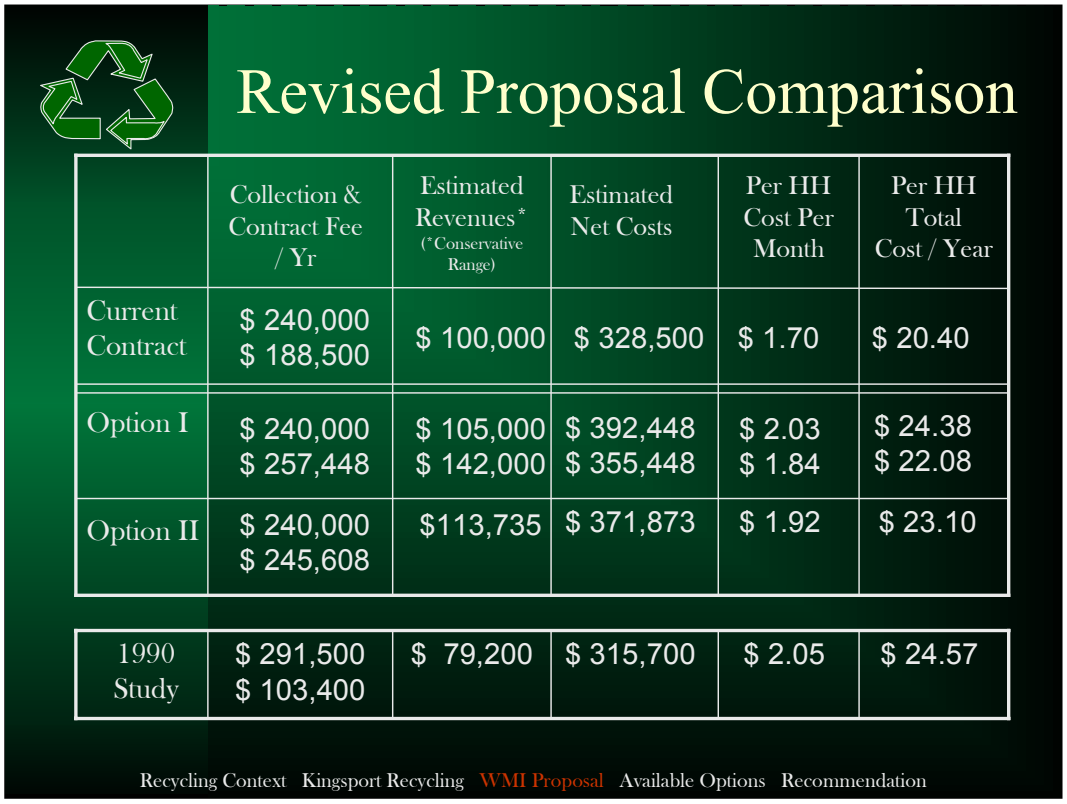
In order to estimate likely revenues across a range of participation rates, Public Works staff prepared the graph above to illustrate the effects participation has on the City net costs. For example, at the City's current participation rate of approximately 50%, the actual costs to the City (after revenues have been deducted from the flat fee) has been approximately $8,200/month which equates with $1.70/month/household. In extending that participation-to-cost relationship over higher rates of participation the City's net costs steadily decline until the contract costs theoretically break-even around 95% participation.

Using this chart to establish a baseline, Public Works staff developed "worst" and "best" case scenarios regarding the likely fiscal impacts for Options 1 & 2.



The chart above compares the prospective fiscal impacts across a range of scenarios including: current costs (1999-00 Net Cost in red), the WMI Net (yellow), the Public Works' Conservative Net cost estimate (green) and the Public Works' Worst Case Net cost estimate (blue).

The chart reiterates that as participation increases, the net costs to the City (under all future scenarios) goes down. If you accept the WMI revenue projects, the chart suggests that participation rates would have to increase to about 66% in order to cover the new costs included in Option 1. The City's projections assume more conservative revenue growth and participation would have to grow to at least 83% to cover the new costs.



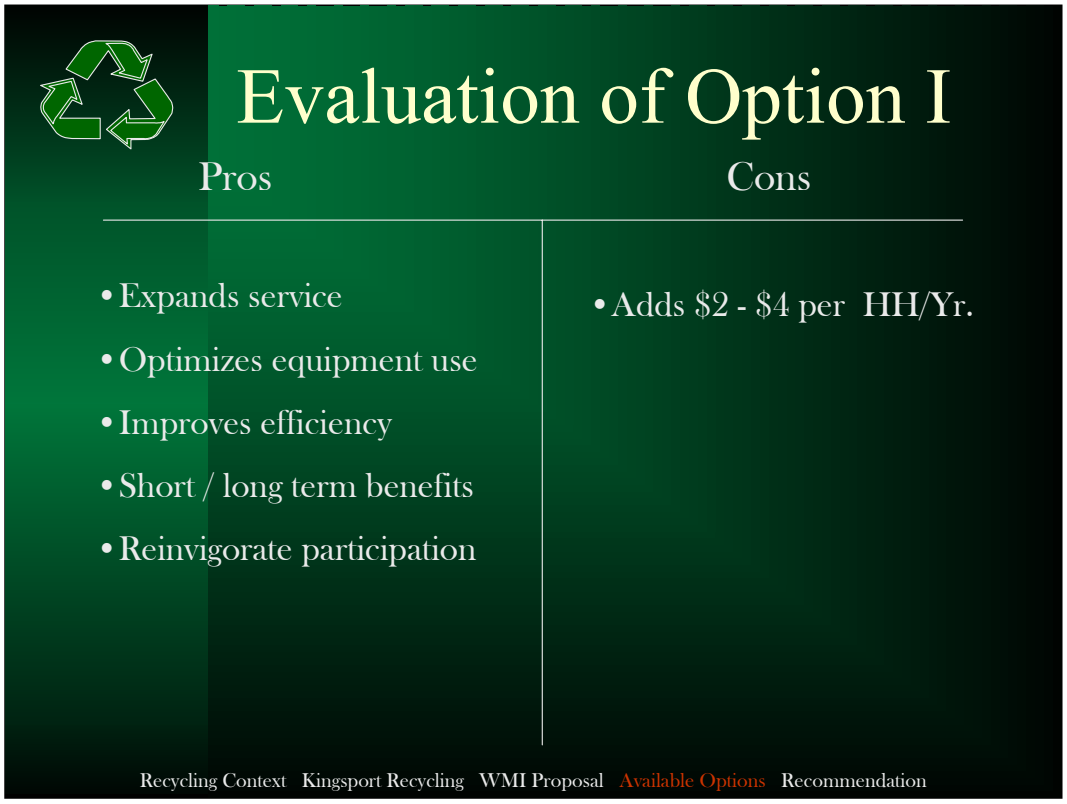
	Collection & Contract Fee / Yr	Estimated Revenues* (*Conservative Range)	Estimated Net Costs	Per HH Cost Per Month	Per HH Total Cost / Year
Current Contract	$ 240,000 $ 188,500	$ 100,000	$ 328,500	$ 1.70	$ 20.40
Option I	$ 240,000 $ 257,448	$ 105,000 $ 142,000	$ 392,448 $ 355,448	$ 2.03 $ 1.84	$ 24.38 $ 22.08
Option II	$ 240,000 $ 245,608	$113,735	$ 371,873	$ 1.92	$ 23.10
1990 Study	$ 291,500 $ 103,400	$ 79,200	$ 315,700	$ 2.05	$ 24.57

Using the Scenario Chart information of Slide 28, Public Works staff revised the service cost chart shown above. In the Revenue column staff reflects a low and a high figure to compare the differences of a "conservative" and "worst case" estimate. The corresponding cost increases for each scenario are listed with all of the options resulting in an increase of less than .25 cents per household/month.

In returning to the original 1990 study projections for service costs, the increases proposed by WMI will still keep the City's service operating less than the 1990 estimate of $2.05/household/month.

The proposed price increases by WMI represented a critical decision point for the City's recycling programs. At issue was whether the proposed increases are reasonable and are at least equal to the perceived value of the services received in partnership with WMI. If they are, then the City can continue the relationship and move forward with the recycling services at a slightly higher price, but if they are not the City must make fundamental policy choices regarding the future direction of recycling in the absence of our partnership with WMI.

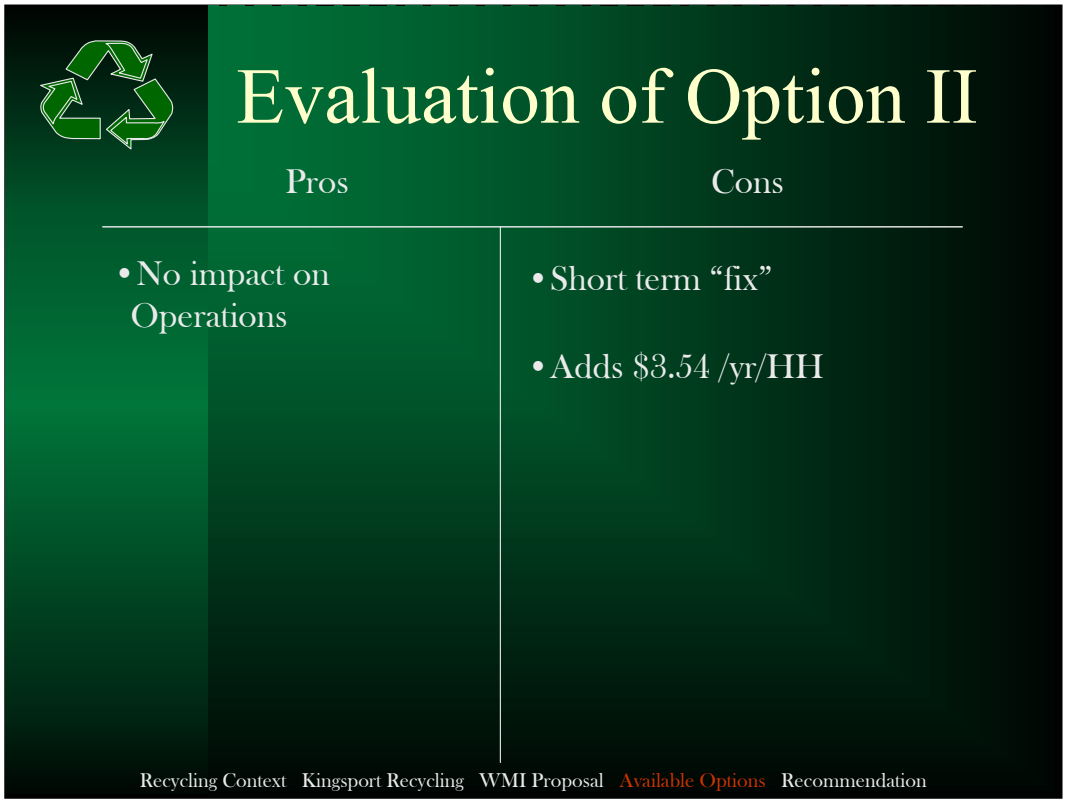
The options presented to the BMA include: Accept Option 1; Accept Option 2; Reject Both and Consider Alternatives.



Public Works staff provided an evaluation of each of the options available to the BMA regarding recycling in Kingsport. A list of "pros" and "cons" were prepared to provide a systematic way to compare each of the options.

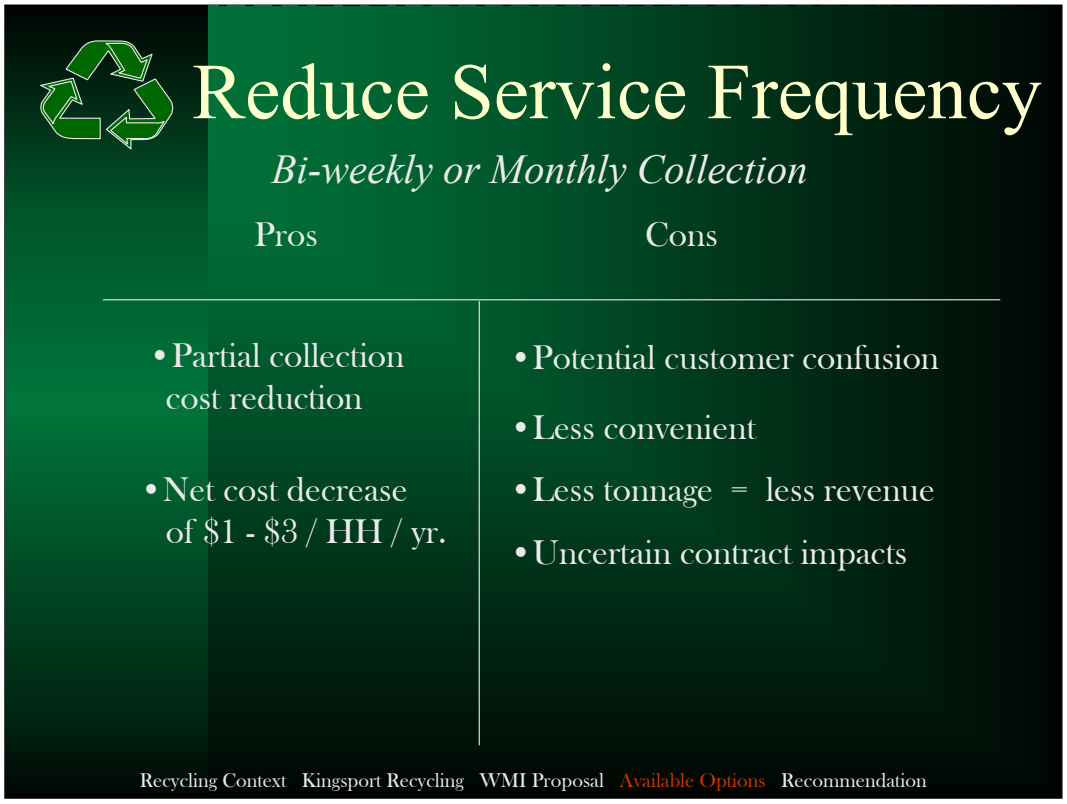
The strength of Option 1 was the addition of the mixed paper which could serve to increase tonnage, improve equipment efficiency (more tonnage on same truck), expand long term revenue growth potential and it offers a chance to reinvigorate residents interest in recycling.

The only true con was the additional cost of $2-$4 per household per year.

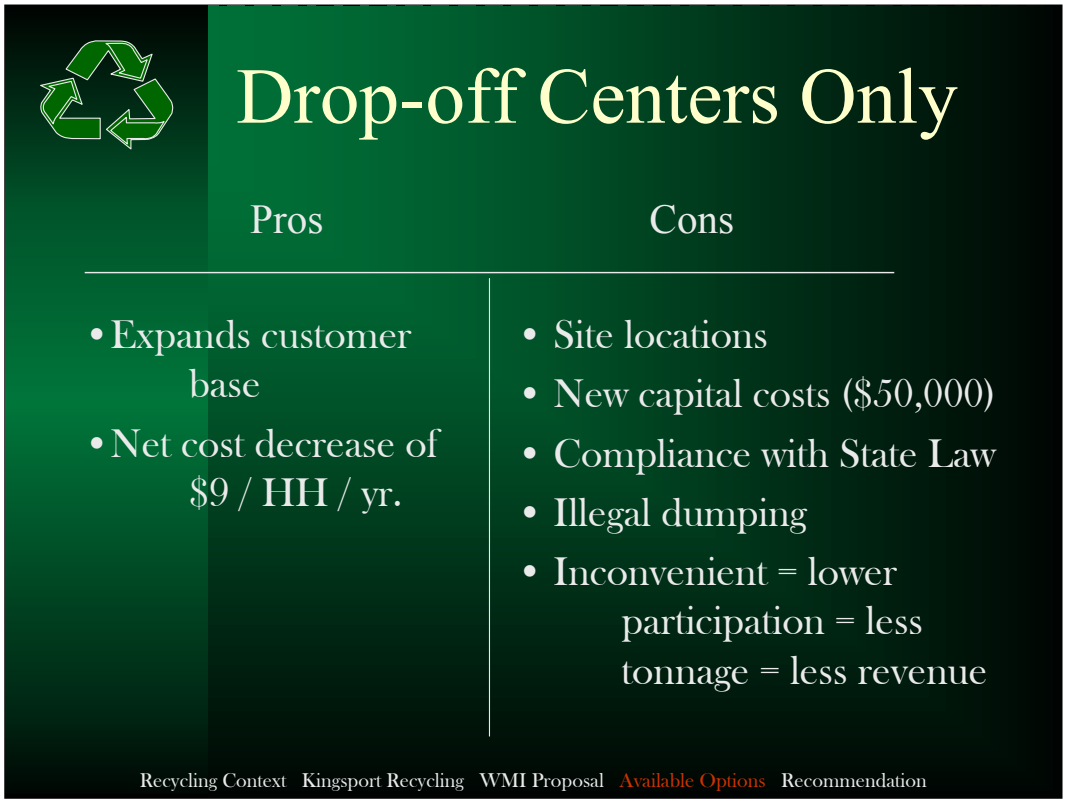


Option 2 had no real impact on operations but it did add $3.54 more to the per household costs per month.

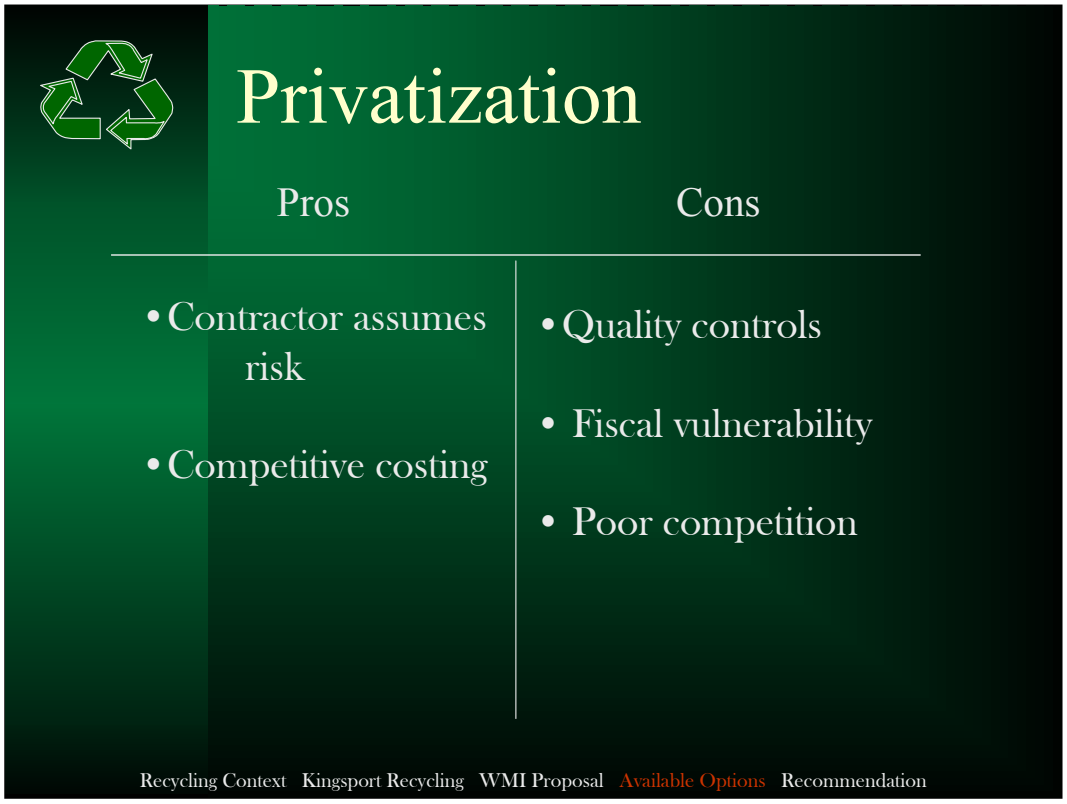
Public Works staff offered a number of alternative ("out of the box") options for BMA consideration.



Reducing service frequency lowers the variable costs of the service but not the fixed costs and because it is less convenient participation (and corresponding revenues) is likely to decline.

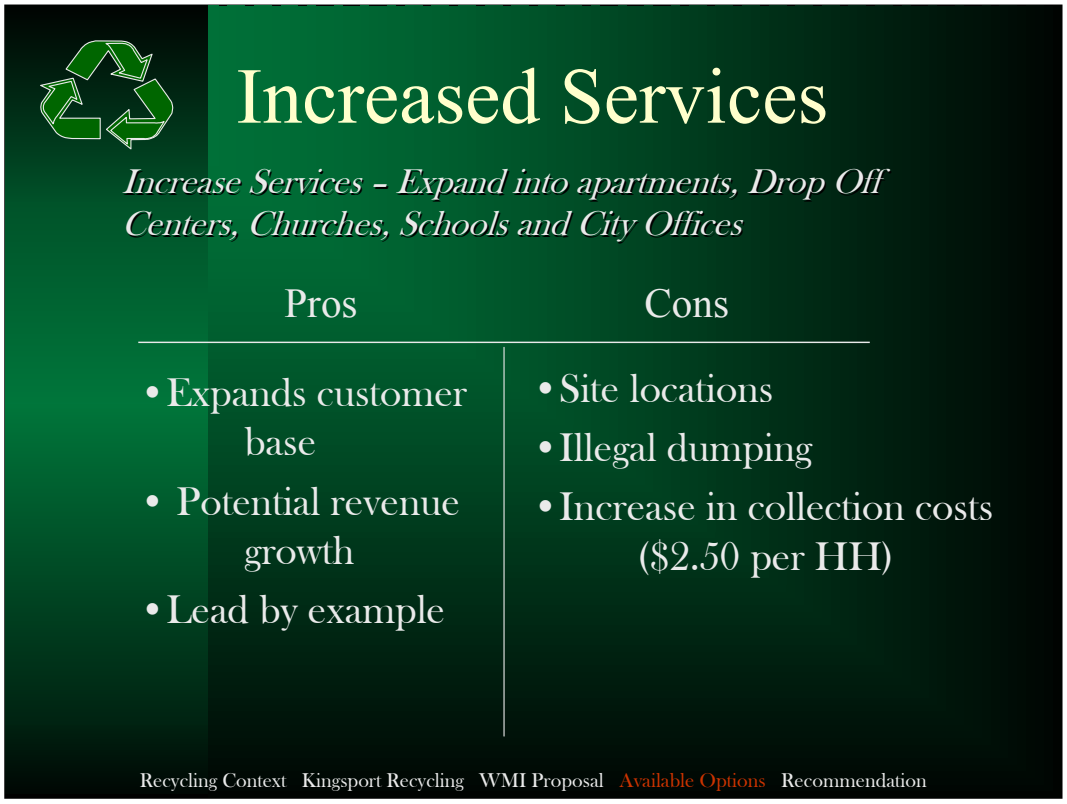


Using drop-off centers is clearly less expensive to operate than curbside service but it is also equally less convenient which has adverse impacts for recycling overall.



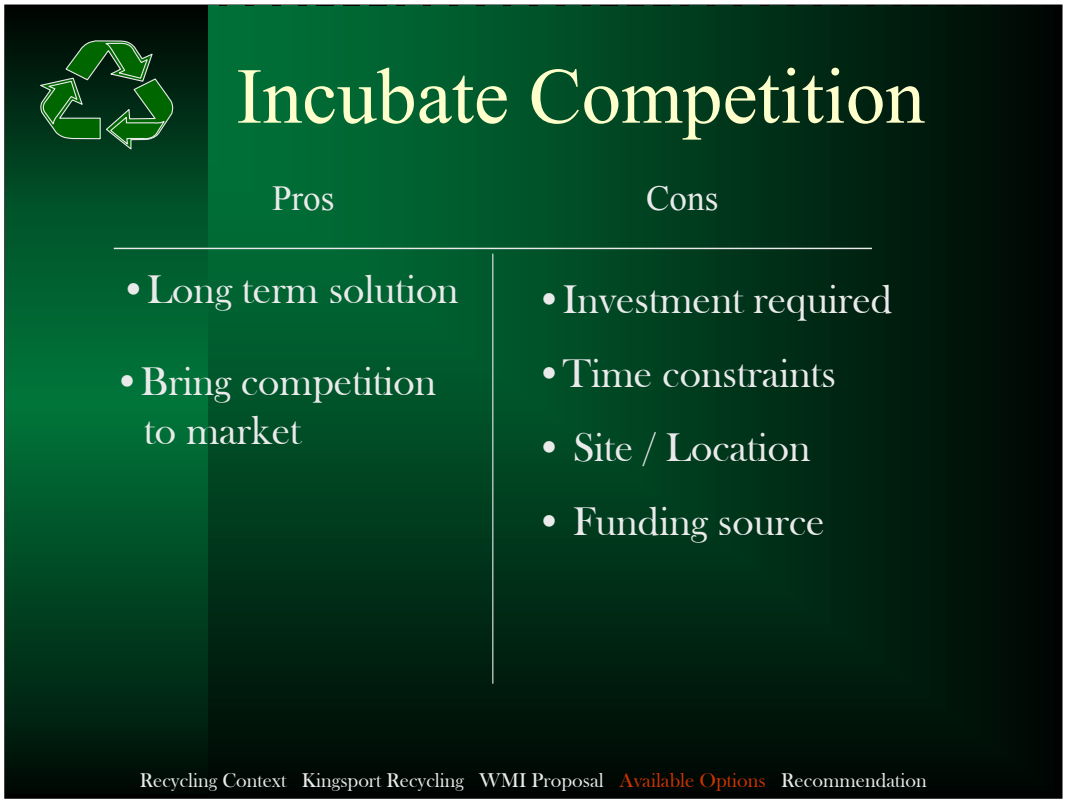
In an area where competition abounds, looking to privatize is a viable option. However, with few prospective contractors in the tri-cities the City runs the risk of becoming dependent upon a contractor who has little incentive to perform high quality service at low cost.

Consideration was given for expanding the City's role in the processing and marketing of recyclables but the high capital investment required in a new facility and the lack of City expertise in global manufacturing markets served to discourage this option.

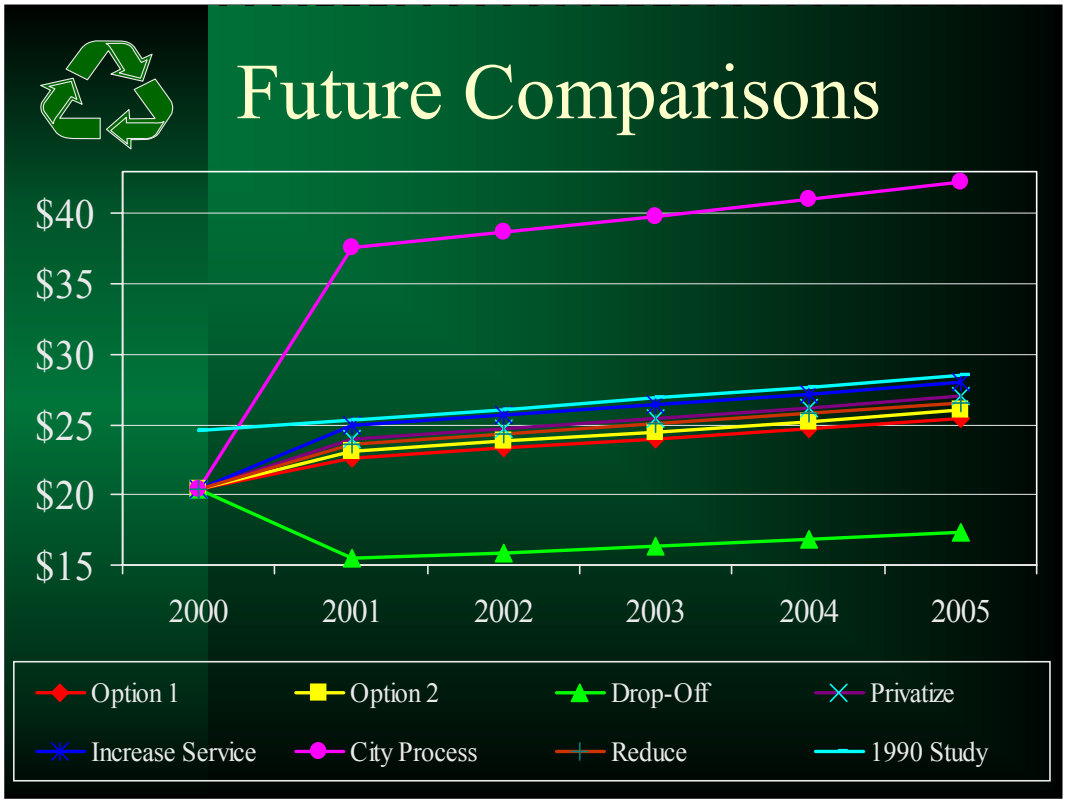


The prospect of expanding the City's collection services into areas that are not currently being served, e.g., Churches, schools, apartments, etc. with recycling services was given serious consideration for the potential revenue growth.

Given the limited private sector competition in the tri-cities region, it was suggested that an opportunity may exist to partner with our sister cities and leverage the economies of scale of a possible regional recycling facility.

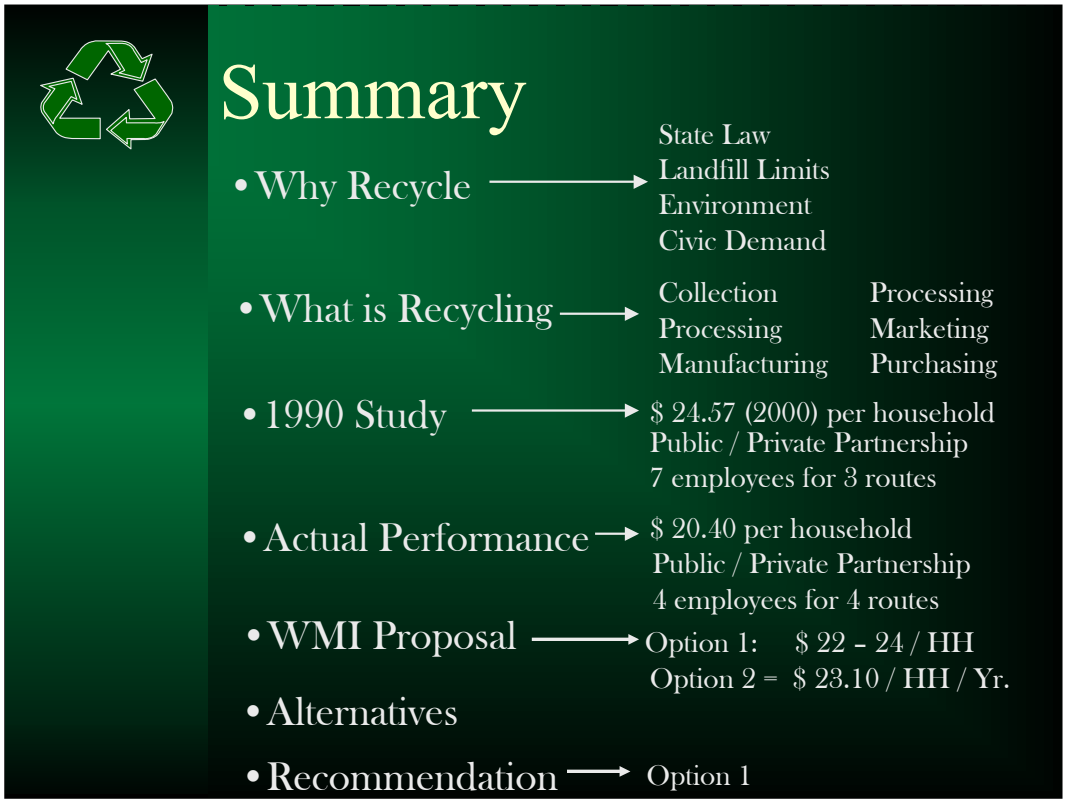


Borrowing from the economic development policies, consideration was given to the idea of establishing tax incentives or other economic incentives to "incubate" new more recycling companies in the tri-cities market.



In order to offer some level of cost comparison between the numerous options presented for BMA consideration, Public Works staff developed very rough cost estimates for each option. These numbers are only meant to provide an order of magnitude degree of accuracy and they are also only intended to convey general trends and parameters.

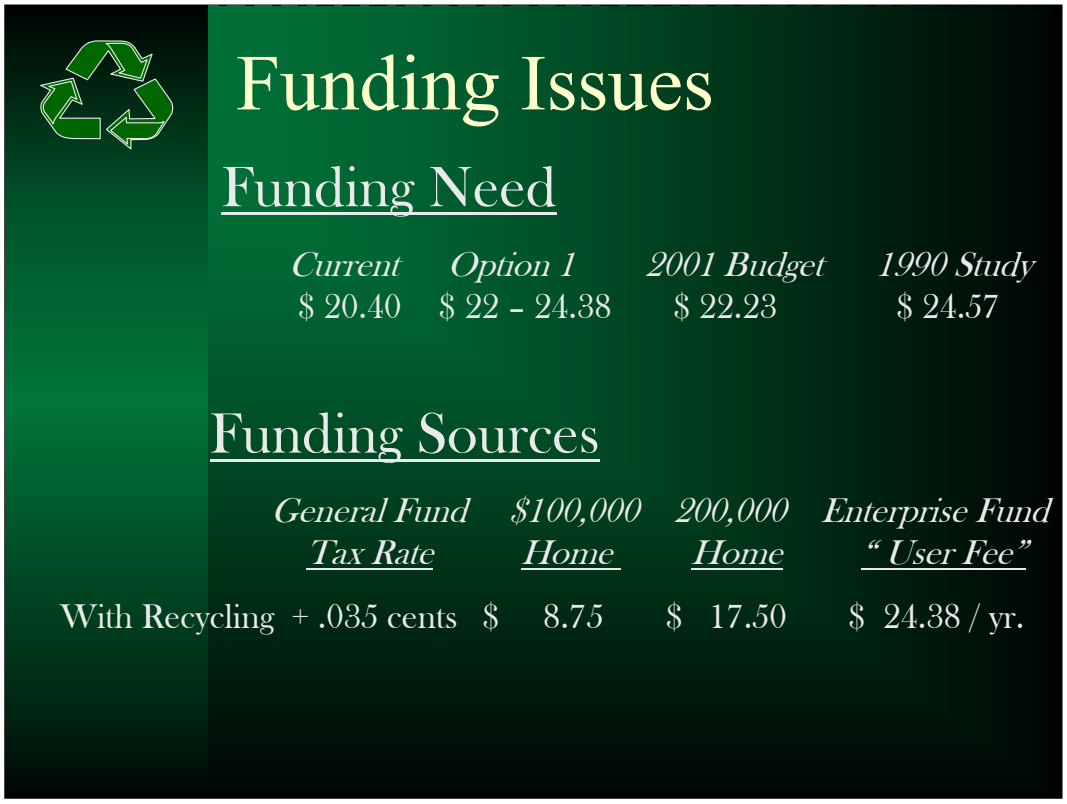
The numbers are fairly speculative but they clearly show the high costs expected from the City building its own recycling facility (pink) and the low costs associated with running drop-off centers (green). Each of the other options fall within a very close cost range and interestingly all of the options presented (except the City building its own recycling facility) fall below the projected costs approved in the 1990 recycling study.



This slide provides a quick review of all of the issues discussed in the presentation.

City staff recommended accepting Option 1 on the premise that it reflected a reasonable price increase ($2 to $4 per household per month), it enhanced customer service by offering more materials to recycle (mixed paper), it maintained the partnership with WMI that had proven successful, it provided a chance to get the public excited again about recycling by offering new materials to recycle, it optimized the fleet and labor usage, and it ensured compliance with state recycling mandates.

From a strategy perspective, staff borrowed a quote from Eastman that referenced the company's efforts to build "a corporate strategy to manage [their] product portfolio with a bias towards businesses that offer the potential for greater value creation, faster return on investment, less cyclicality and lower capital intensity" to explain the City's preference for Option 1. In other words, Option 1 offered more service with the prospect of greater revenue growth and possibly a lower future net service cost.



Public Works reported to the BMA that the FY01 budget had adequate funds to cover the prospective cost increases. However, future years' budgets would have to be increased to reflect the full funding of the new contract fees.

In order to facilitate a discussion of possible funding sources, e.g., General Fund vs. a user fee, Public Works staff converted the new contract costs to actual budget figures. Using this approach the additional recycling fees would require a .035 cent addition to the tax base which for the average $100,000 valued house would require an paying $8.75 more per year in taxes. Under a user fee approach the full $24.38 would be paid by the homeowner -- presumably with some corresponding decline in taxes.

Public Works staff emphasized the value of moving forward with a more comprehensive recycling promotion campaign. Staff benchmarked top performing cities and each of the items listed were integral components of successful programs.