Oakland County
Capital and Cooperative Initiatives
Revolving Fund

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SUMMARY REPORT

PROJECT APPROACH

Scope of Work

Through the Oakland County Capital and Cooperative Initiatives Revolving Fund, Resource Recycling Systems (RRS) was retained to assist the seven participating communities of Brandon, Groveland, Independence, Springfield, Waterford, West Bloomfield and White Lake Townships to evaluate and report on the alternatives for a cooperative solution for the processing of residential solid waste and recycling services. The primary scope of activities and deliverables identified by the retainer included:

- Identification of Cooperative Structures
- Identification of Procurement/Contracting Structures
- Identification of Potential Cooperative Partners
- Evaluation of Existing and Emerging Technologies
- Quantification of Potential Community Costs/Benefits
- Community Input/Feedback
- Final Recommendations

To develop the products above with the greatest relevancy, utility, and potential for community acceptability, RRS organized the communities and its own activities around three major areas of work:

1) Analysis and Evaluation of Current Conditions and Best Practices
2) Conversion Technology Fact Finding and Preliminary Analysis
3) Stakeholder Education and Discussion

These activities, in turn, would provide the basis for a set of conclusions and recommendations and a proposed implementation and transition plan for the development of a significantly improved set of service offerings for residents in the CCIRF communities and potentially other adjacent communities in north Oakland County.

PROJECT MEETINGS

Project Kick Off & Participants

The project was launched on January 13, 2009 with a meeting of all project communities and Oakland County representatives. The participating communities and representatives for this project are:

- Kathy Thurman, Supervisor, Brandon Township
- Robert DePalma, Supervisor, Groveland Township
- David Wagner, Supervisor, Independence Township
- Mike Trout, Supervisor, Springfield Township

- Carl Solden, Supervisor, Waterford Township
- Michele Economou Ureste, Supervisor, West Bloomfield Township
- Mike Kowall, Supervisor, White Lake Township

Other representatives from the communities that participated in the project meetings included:

- Charlene Carlson, Trustee, Brandon Township
- Sharon Howard, Supervisor's Office, Independence Township
- Stacy St. James, Environmental Coordinator, Waterford Township
- Marshall Labadie, Development Services Director, West Bloomfield Township

Representatives from Oakland County who also participated:

- Whitney Calio, Solid Waste/Environmental Program Coordinator
- Brad Hansen, Brownfield/Environmental Program Coordinator
- Art Holdsworth, Deputy Director of Purchasing

At this meeting, a pattern of providing information about project focus areas, discussing for understanding and utility, providing any course correction, and establishing methods for involving broader community feedback was established.

Community Direction and Needs
After the project kick-off meeting, RRS conducted one-on-one interviews with each participating community. Prior to each meeting, the communities were asked to compile solid waste and recycling information for their community. These meetings assisted with data collection on current conditions and also identified the three main questions the participating communities wanted to answer as a result of this study:

- Are there efficiencies in these communities working together?
- What systems can increase recycling and waste diversion in these communities?
- Are conversion technologies feasible?

The eventual answers to these questions became central conclusions which informed the recommendations and transition implementation steps proposed for consideration by the communities.

Regular Project Meetings
The project meeting schedule was developed to conduct meetings every other week to undertake the various aspects of the project. A total of six regular meetings were conducted, (in addition to the conversion technology vendor interviews and one-on-one stakeholder meetings described elsewhere). The meetings served as educational opportunities for the participating communities to receive presentations on established best practices and proven options for of successful solid waste and

recycling programs and to discuss their applicability to the participating communities circumstances. Information about organizational structures, processing technologies, and contracting techniques were discussed, along with the practical considerations involved with the adoption of the various strategies, to facilitate informed evaluation of recommended options at the end of the study.

A complete set of meeting materials is included in Appendix C Information provided and reviewed at the project meetings included:

- Waste and recycling estimates for the participating communities
- Projected growth in waste and recycling over the next 20 years
- Identifying and reviewing comprehensive solid waste and recycling program components
- Case studies of programs in and around Oakland County
- Review of benefits and considerations of different solid waste system models
- Projections by community of potential waste diversion under different system model scenarios
- Projections by community of potential cost savings under different system model scenarios
- An overview of various conversion technologies—alternatives to conventional solid waste landfills
- A tour and briefing at a regional recycling authority in Oakland County (SOCRRA)

TECHNOLOGY REVIEW

Conversion Technology Basics

As part of the regular meetings described above, RRS provided briefings regarding the various types of established conversion technologies, their processes, attributes and their applicability for typical waste processing requirements. A discussion regarding the process for evaluating and developing these early technologies was also prepared and conducted.

Conversion Technology Options

To determine the current compatibility of the alternative (or conversion) technologies with the participating communities, RRS conducted a literature review of current and ongoing studies being conducted in areas around the country and released a Request for Information (RFI) to vendors of these technology systems. Vendors that met the identified criteria were invited to a vendor interview, held April 21, 2009. Of the nine responses received, four companies were invited, and three participated (one could not attend due to scheduling conflicts). The interviews allowed the participating communities to ask further questions and interact with these types of vendors to determine if their system is a good fit for the waste management needs and goals of the participating northern Oakland County communities. A more detailed summary of the technology component of this study is provided in the Technology Section, and the entire process is documented in Appendix D.

COMMUNITY INPUT/FEEDBACK

Stakeholder Communication

Throughout the course of the study, the project communities were actively involved in communications with their residents and Boards. Executive briefings suitable for broad dissemination were produced as a way of reporting to a larger group of stakeholders about each meeting. RRS provided several information pieces about the project including a summary of system models, benefits of recycling, and several project updates. This information was shared at township halls and on websites. Presentations were made to each Township Board by RRS about the status of the project during the months of April and May. These materials are included in the project meetings materials Appendix C.

Community Surveys

To further solicit the community resident input; each participating community hosted a customized online survey about the study and solid waste issues. The survey questions targeted resident preferences to solid waste and recycling services, and sought information on current service levels, pricing and satisfaction. Overall, 1359 residents between the seven communities responded to the survey by the end of May 2009. A summary memo and compilation of these surveys is provided in Appendix F.

PRELIMINARY RECOMMENDATIONS

TABLE 1. TOTAL WASTE GENERATION (ESTIMATED)

Townships	Population	Single Family Households	GENERATION			
			TOTAL TONS	Waste Generation	Recyclables	Yard Waste
BASELINE	233,911	69,663	94,918	94,918	-	-
DUAL STREAM RECYCLING	233,911	69,663	94,918	65,149	9,336	20,433
SINGLE STREAM (SS)	233,911	69,663	94,918	58,811	15,674	20,433
SS WITH RECYCLEBANK	233,911	69,663	94,918	46,620	27,865	20,433
SS WITH RECYCLEBANK AND ORGANICS COLLECTION	233,911	69,663	94,918	36,171	27,865	30,882
CONVERSION TECHNOLOGY	233,911	69,663	94,918	53,108	21,377	20,433

Waste Generation & Cost Projections

Utilizing information provided by the communities, industry and regulatory information, and adjusted in consideration of other local generation rates and RRS knowledge and experience of the region, the likely number of households and volume of materials required to be managed by the communities was used as a basis for discussion and modeling of potential programs, as shown below. In a similar fashion, utilizing recent local contracts awards, posted and surveyed rates, and established municipal rates in the region, cost projections were developed for various service levels, as shown below.

TABLE 2. COST PROJECTIONS (BASED ON SINGLE STREAM MODEL)

		Households	COST PER MONTH		COST PER QUARTER		COST PER YEAR	
Townships	**Population**	**Single Family**	**Cost per Household**	**Cost per Community**	**Cost per Household**	**Cost per Community**	**Cost per Household**	**Cost per Community**
Brandon	13,897	3,881	$ 12.17	$ 47,244	$ 36.52	$ 141,732	$ 146.07	566,928
Groveland	6,350	1,672	$ 12.32	$ 20,594	$ 36.96	$ 61,783	$ 147.84	247,133
Independence	34,307	9,906	$ 13.06	$ 129,376	$ 39.18	$ 388,129	$ 156.73	1,552,517
Springfield	14,182	4,195	$ 12.49	$ 52,407	$ 37.48	$ 157,220	$ 149.90	628,881
Waterford	69,667	22,204	$ 13.07	$ 290,149	$ 39.20	$ 870,446	$ 156.81	3,481,785
West Bloomfield	65,089	18,769	$ 13.04	$ 244,741	$ 39.12	$ 734,224	$ 156.47	2,936,895
White Lake	30,419	9,036	$ 12.54	$ 113,319	$ 37.62	$ 339,956	$ 150.49	1,359,823
TOTAL	**233,911**	**69,663**	**$12.67**	**$ 897,830**	**$38.01**	**$ 2,693,490**	**$152.05**	**$ 10,773,962**

This chart demonstrates the economic viability of the CCIRF communities to command a market response to any service solicitation, based on their relatively large combined size, and a clear financial benefit to the rate payer if an organized community wide contract is established. Considered in conjunction with the viable strategies and options for organizations presented during the project, it became clear that there are many opportunities for these seven communities in northern Oakland County in regards to solid waste and recycling management.

A set of considerations was offered for community feedback, and an entire meeting devoted to discussing the viability of the following recommendations.

Preliminary Recommendations

- These communities should pursue a formal cooperative approach that will allow them to leverage their buying power to induce improved collection and processing services and reduce costs for their resident taxpayers.
- Municipally organized and contracted services should be developed to gain a range of new services, reduce taxpayer cost and to support development of alternatives to landfilling.
- The determination of ultimate viability of conversion technologies can only be and should be answered with marketplace testing through a bona fide procurement process.
- These communities should continue uninterrupted in pursuing the benefits of cooperation with the creation of a cooperative structure and the development of a transition plan that accommodates identified keystones to system development.

CONCLUSIONS AND RECOMMENDATIONS

Community Needs

The three main questions the participating communities wanted to answer as a result of this study have answers that are both definitive and yet still will require a decision and commitment on the part of the communities to continue with this project to provide a detailed answer.

1) *Are there efficiencies in these communities working together*? Experience in Oakland County, in Michigan and across the country has shown that communities that cooperate to develop services benefit from economies of scale, market position, and shared administration and educational costs that result in lower rates and a high degree of service, along with the ability to adapt to changing practices and requirements. These communities have indicated a willingness to develop a specific organizational form that will allow them to capture those efficiencies. Additionally, these communities along with others adjacent have a history of cooperation through the NO HAZ program, and all will continue to benefit as long as membership is shared and willingly accepted with a focus on service waste service delivery.

2) *What systems can increase recycling and waste diversion in these communities?* Community wide collection systems combined with locally available processing options and the contractual ability to provide incentives, ensure service standards and to negotiate revenue sharing are proven top performers in landfill diversion. The ability to leverage the contracted waste stream to encourage investment in processing and collection technology can also be crucial, at times. The ability to access emerging single stream recycling, incentives, and advanced composting technologies will improve diversion and are comparatively simple for residents to participate in.

3) *Are conversion technologies feasible?* The answer here is a definitive maybe. Just as clear as some of these emerging technologies reliability and functionality is improving, landfill rates are extremely low and space is plentiful. The rigor that can be imposed and the confidence that can be drawn from the RFI process indicates that at a potentially premium price point, or on a limited waste stream (ie-yard waste only) it is possible that some of these conversion technologies are feasible, or could become feasible with our evolving energy and commodity marketplace. In any event, regulatory, siting, and financing and due diligence considerations place the conversion technologies on a longer development cycle than the clear advantages accessible through cooperation in the immediate term.

Cost and Revenues

Building on the original tonnage and service projections, RRS prepared a new system cost projection that used costs provided by the RFI submissions, along with some scenarios for recyclables and organic materials revenues. A project memo including the different scenarios is attached as Appendix A. The significant consideration below is how extremely variable the feasibility of the more aggressive conversion approaches are compared to the relatively low cost and predictability from a proven recycling/composting program. As recycling revenues increase, the relative cost of conversion technologies and recycling incentives improve dramatically. The low cost solution in the best market is one that combines a recycling incentive program with advanced anaerobic composting. The potential for power generation revenues to increase this variability is possible, but unknown.

TABLE 3. SYSTEM COSTS AT $35 PER TON TIP FEE (CONVERSION TECHNOLOGY) WITH REVENUE ESTIMATES

Townships	REVENUE - LOW			REVENUE - MEDIUM			REVENUE - HIGH		
	REVENUE TOTAL	REVENUE PER HSHLD	NET COST PER HSHLD	REVENUE TOTAL	REVENUE PER HSHLD	NET COST PER HSHLD	REVENUE TOTAL	REVENUE PER HSHLD	NET COST PER HSHLD
BASELINE	$ -	$ -	$ 200.00	$ -	$ -	$ 200.00	$ -	$ -	$ 200.00
DUAL STREAM RECYCLING	$ 586,869	$ 8.42	$ 146.05	$ 1,036,666	$ 14.88	$ 139.59	$ 1,730,465	$ 24.84	$ 129.63
SINGLE STREAM (SS)	$ 777,199	$ 11.16	$ 140.89	$ 1,428,307	$ 20.50	$ 131.54	$ 2,489,056	$ 35.73	$ 116.32
SS WITH RECYCLEBANK	$ 1,143,302	$ 16.41	$ 142.47	$ 2,181,635	$ 31.32	$ 127.56	$ 3,948,218	$ 56.68	$ 102.20
SS WITH RECYCLEBANK AND ORGANICS COLLECTION	$ 1,300,044	$ 18.66	$ 142.13	$ 2,416,748	$ 34.69	$ 126.10	$ 4,261,701	$ 61.18	$ 99.62
CONVERSION TECHNOLOGY	$ 2,016,903	$ 28.95	$ 161.88	$ 3,141,465	$ 45.10	$ 145.74	$ 5,342,527	$ 76.69	$ 114.14

Conversion Technology Tip Fee=$35.00 per Ton
Conversion Technology Collection Cost = $10.75 per Month

RECOMMENDATIONS

The CCIRF communities should begin work to finalize the details of a solid waste authority with:

- the authorization to seek services on behalf of its founding communities. The formation and operation of an authority in the near term will also greatly benefit the ability to request and receive legitimate pricing in any procurement process.
- Included in this development should be outreach to adjacent communities which have expressed an interest.

The CCIRF communities should begin work on the specifics of a community wide hauling contract and procurement specifications.

- Specifications will detail important items such as service levels desired within each community, the creation of service zones for specific services, procurement preferences or requirements of the communities, any use of automated collection or incentives, and service procurement order and calendar.
- Develop an implementation schedule based on existing agreements and procurement requirements.
- A transitional service would be developed with an eye toward moving to a conversion technology, when and if feasible.

The CCIRF communities should request proposals from conversion technologists.

- As part of the proposed procurement process, evaluate for viability and desirability to conduct due diligence activities.
- Narrowing the field to not more than two.

- Begin specific negotiations around location and siting timeframe, price point and materials guarantees, and financing in a controlled and actionable environment.

A more detailed set of implementation steps is included in Appendix G. A transitional service agreement(s) that provides an option for a shorter (ie 3 years) term would be developed, initially. This will allow for community acquaintance with the program, an opportunity for program contract adjustments, and the potential of moving to a conversion technology if deemed desirable. A general time frame for implementation follows:

June/July-	present findings to member Boards
July/August	prepare Authority Articles and By Laws and present to Boards
July-September	prepare procurement specifications and calendar
August/September	conduct outreach and briefings to potential members
October/December	conduct procurement and evaluation
December	prepare transition plan for service implementations
September-Spring ’10	conduct municipal activities to authorize membership, service contracting
October-Spring ’10	conduct conversion technology due diligence/negotiations as required
Spring ’10	begin community wide services
Spring ’13	begin new community wide service agreement

SECTION I
CURRENT CONDITIONS EVALUATION

The seven participating communities represent roughly 235,000 residents in northern Oakland County. Despite being geographically located together, these communities represent a broad cross section of population densities and solid waste related services, as is typical throughout Oakland County.

OVERVIEW OF CONDITIONS IN OAKLAND COUNTY

Based on a study conducted in 2006 by Resource Recycling Systems and RRRASOC for Oakland County, approximately 67% of Oakland County's municipalities have contracted solid waste collected services. Most contracted communities, similar to those in this study, include a basic level of weekly solid waste and recycling collection, and seasonal yard waste pick-up.

Twenty of the 61 communities in the County participate in one of two regional authorities—RRRASOC and SOCRRA. These two authorities continue to model effective partnership between communities for recycling and solid waste services.

- RRRASOC includes eight member communities on the south west side of the County (Farmington, Farmington Hills, Novi, Southfield, South Lyon, Walled Lake, and Wixom). RRRASOC owns a Material Recycling Facility (MRF) that is privately operated, provides a 24 hour a day/7 days a week recycling drop-off facility, and hosts a number of HHW collection events each year. The RRRASOC MRF is transitioning to a "single-stream" recycling facility over the next year.

- SOCRRA includes 12 member communities on the southeast side of the County (Berkley, Beverly Hills, Birmingham, Clawson, Ferndale, Hazel Park, Huntington Woods, Lathrup Village, Oak Park, Pleasant Ridge, Royal Oak, and Troy). SOCRRA also owns and operates a MRF, transfer station, and compost facility. A recycling drop-off is available along with HHW and electronic recycling by appointment. In 2006, SOCRRA contracted for solid waste and recycling collection services on behalf of its member communities, and achieved between 10 -17% savings on current collection costs their members were paying.

The No HAZ program is the most recent addition to communities working together in the County. The program has lead to increased access by County residents to HHW programs with several collections per year (4 in 2009). Currently 15 communities participate in this program that was established through inter-local agreements between the communities and the County. The program has collected over 1 million pounds of HHW. This partnership is a good example of partnerships that can lead to increased services and lower costs.

Oakland County's location in southeast Michigan and to neighboring Genesee County allows for plenty of access to area recycling, composting, and disposal facilities. There are roughly seven major landfills, seven material recycling facilities, and several compost sites all with capacity to accept materials from communities in Oakland County.

Disposal Facilities	Recycling Facilities	Compost Facilities
Eagle Valley, Oakland County	SOCRRA	SOCRRA
Carleton Farms, Wayne County	RRRASOC	Tuthill Farms & Composting, Oakland Co.
Sauk Trail Hills, Wayne County	Great Lakes Recycling, Macomb County	Spurt Industries, Oakland Co.
Woodland Meadows, Wayne County	Great Lakes Recycling, Wayne County	Veolia Arbor Hills, Washtenaw Co.
Vienna Junction, Monroe County	CBC Recycling, Genesee County	
Veolia Arbor Hills, Washtenaw County	Veolia Arbor Hills, Washtenaw County	
Citizens Disposal, Genesee County	City of Ann Arbor, Washtenaw Co.	

EXISITING PROGRAMS AND SERVICES IN PARTICIPATING COMMUNITIES

Waste Collection

Five of the seven communities' residents secure solid waste and recycling services on their own (Brandon, Groveland, Independence, Springfield, and Waterford Townships). Several of these townships are primarily rural where subscription services are usually prevalent; however, Waterford Township is one of the largest communities participating in the study and is denser than some of its neighbors. Residents in these communities have varying levels of service from trash collection only to the full spectrum of trash, recycling, yard waste and bulky item pick-up at their homes. Approximately 11 of the haulers provide services in these areas, based on information provided by residents through an online survey. Pricing ranges, depending on the level of service were reported between $45-$108 per quarter. Acceptable recyclables vary from hauler to hauler, and some services such as bulky item removal and yard waste are provided on call at an additional fee. Several of these townships are primarily rural where subscription services are usually prevalent; however, Waterford

Service Providers

Smith's	Taddonio
1-800-Rolloff	Nichols
Republic	Waste Away
Richfield	JD Waste
Tringali	
Waste Management	
Odd Job Disposal	

Collected from CCIRF resident survey. Spring 2009.

Township is one of the largest communities participating in the study and is denser than some of its neighbors.

Two of the participating communities utilize other approaches to solid waste services in their communities—community-wide contract and preferred hauler. White Lake Township manages a community-wide contract for service with Allied Waste. The contract includes weekly trash and recycling collection.

West Bloomfield Township employs a "preferred hauler" approach in addition to a hauler licensing program. In the "preferred hauler" approach, the community conducts a competitive bid process to secure a specific level of service and pricing for that service. Residents may then choose the preferred hauler or opt to choose another licensed hauler that services the community. There are currently four licensed residential haulers and five licensed commercial haulers. As part of the licensing agreement, West Bloomfield Township conducts annual inspections of the collection vehicles.

Data tracking in all of the participating communities is limited or non-existent so accurate waste and recycling data along with participation rates is not available.

TABLE 4. SUMMARY OF OAKLAND COUNTY TOWNSHIP SOLID WASTE AND RECYCLING SERVICES (2006)

	Subscription	Contract	Hauler	Licensed Haulers	Recycling Drop-off	Clean-up Events	HHW
Addison Twp	X						
Bloomfield Twp		X	Rizzo				X
Brandon Twp	X						X
Commerce Twp		X	Republic				X
Groveland Twp	X				X		X
Highland Twp		X	Richfield				X
Holly Twp	X				X	X	
Independence Twp	X				X	X	X
Milford Twp		X	Richfield				X
Oakland Twp	X						X
Orion Twp	X			X	X		X
Oxford Twp	X						X
Rose Twp	X				X		
Royal Oak Twp		X	Allied				
Springfield Twp	X				X	X	X
Waterford Twp	X				X		X
W. Bloomfield Twp	X*	X*	Richfield	X			X
White Lake Twp		X	Republic				X

* Preferred hauler agreement with Richfield; residents select service from any licensed haulers.

Household Hazardous Waste Programs

Household Hazardous Waste (HHW) collection is offered at various levels throughout these seven communities. Three communities (Groveland, Waterford, and White Lake) work with the County's No HAZ program, an inter-local program that offers four collections per year and the County acts as coordinator for the program. Brandon Township also participates in this program when funding is available, recently every other year.

Independence Township operates its own HHW program through its Department of Public Works. This program is offered once per year, usually in the spring. Springfield Township residents also utilize this program, although participation and promotion of this service is extremely low.
West Bloomfield secures these services through its preferred hauler arrangement. The program is offered two times per year for these township residents only.

WASTE AND RECYCLING PROJECTIONS

As stated earlier, solid waste and recycling data is not actively collected or provided to any of the participating communities. In order to make recommendations for this study, waste generation and potential diversion rates were projected for each community based on nation-wide averages and local data from similar sized communities. Population data was obtained from SEMCOG, although despite recent trends in Michigan's economy, shows population steadily increasing, when if fact, this may not be accurate. The following table offers projections with the assumption that recycling is being diverted through a dual-stream method (fiber collected separated from plastic, metal and glass recyclables) and that some yard waste is being collected on a weekly basis seasonally (usually April through November).

TABLE 5. WASTE GENERATION PROJECTIONS (DUAL STREAM MODEL)

		Households	GENERATION			
Townships	Population	Single Family	TOTAL TONS	Waste Generation	Recyclables	Yard Waste
Brandon	13,897	3,881	4,808	3,745	245	818
Groveland	6,350	1,672	2,071	1,613	105	352
Independence	34,307	9,906	14,299	9,576	1,839	2,884
Springfield	14,182	4,195	5,103	3,610	337	1,156
Waterford	69,667	22,204	30,552	20,685	2,598	7,270
West Bloomfield	65,089	18,769	27,094	18,144	3,485	5,464
White Lake	30,419	9,036	10,992	7,776	727	2,489
TOTAL	233,911	69,663	94,918	65,149	9,336	20,433

SECTION II
BUILDING SUCCESSFUL SOLID WASTE AND RECYCLING PROGRAMS

OVERVIEW

There are a number of ways to structure a solid waste and recycling program that will support the next generation of solid waste management and recycling services. Different organizational and funding mechanisms are needed depending on which approaches to implementation are taken. Intergovernmental opportunities will vary depending on the implementation model that is chosen.

The Michigan Constitution of 1963 and Michigan law provides for practical methods and means for local units to establish, maintain and enforce a solid waste management and recycling system necessary for the public health and welfare of the residents of the participating communities, residing within the jurisdictions of the local units that are participating in the system.

It is necessary for the participating local units to contract relative to the establishment, operation, administration, enforcement and maintenance of the solid waste management and recycling system. Using the powers of the local unit of government in any of the intergovernmental structures described below requires a careful assessment of these roles and who is best able to perform these operational and administrative functions, who has the greatest capability and who is best positioned to fund and absorb risks. Depending on the answers to these questions, the intergovernmental approaches described may be mixed and matched as needed to best service local needs.

If a system is selected that requires public sector financing support, there are financing tools available in Michigan for use in developing solid waste and recycling services. For these tools to be effectively used, the financing structure must be compatible with and be support by the cooperative structures selected.

The following is an overview of program components, system models, and cooperative structures available for CCIRF communities to utilize. A more detailed description is provided in Appendix B.

PROGRAM COMPONENTS

The components of a successful solid waste and recycling program can also be tied to levels of service. The more comprehensive the services provided, the more success in achieving high diversion rates at manageable costs for those services.

Most communities offer a basic program that provides for weekly collection of trash and recycling, along with seasonal (April – November) weekly collection of yard waste. This type of program may also include bulky waste removal such as large appliances to some degree, weekly or once a month. Communities often rely on the selected vendor to ensure the materials collected are transported to the appropriate facility, rather than directing those materials themselves.

There can be many variables of these program components. Trash may be collected in bags, cans or large 96-gallon carts. Recycling may be collected source-separated, dual-stream, or single stream. Yard waste may include brush and branches, fall leaf collection or chipping services. Separate contracts for recyclables processing, compost processing, and disposal are pursued. More advance programs incorporate more of these variables and achieve increased diversion and cost control.

For example, collecting recyclables and organics separately from waste can help control costs by controlling the waste stream and allowing more efficient routing by public or private sector service providers. The separation of recycling and organics collection reduces waste that is setout, which in turn reduces disposal costs and potentially leads to reduced collection routes for waste collection. In addition, collection of recyclables further off-sets the cost of collection by generating revenue from the sale of recyclable commodities.

The current trend of collection programs is towards single-stream recycling and fully automated collection, both incorporating the use of carts to be successful. Using carts for waste and recycling can significantly increase recycling collection, both through the increased efficiency of collection, and through the incentive to reduce waste. The material that cannot fit in the cart must either be collected by a special bulky route or directed to a super drop-off. This creates an incentive for residents to reduce their waste to what will fit in the cart.

Single steam recycling, the most convenient type of recycling collection available, is a type of recycling collection in which recyclable paper, plastic, metal, and other materials are placed into a single cart. Most curbside recycling programs provide an 18-gallon container for the collection of recyclables, and then collect the materials in two streams—fiber and containers (plastic, metal, and glass)—also called dual stream recycling. Although single steam's applicability differs from community to community, it is generally the most efficient and cost-effective form of collection, which usually corresponds with increased community participation in recycling, increased amount of recyclables collected, and a reduction in waste collection.

Single-stream recycling has also produced incentive based programs that encourage recycling through rewards for participating residents. Recycle Bank is one such program that was recently launched in Rochester Hills. Carts for the collection of recyclables are provided to each household. The carts contain a RFID (Radio Frequency Identification) chip that when collected is read by the collection vehicle so that participating recycling is tracked. Each pound of recyclables earns residents points, which are then redeemable as coupons and certificates to local and national retailers.

Automated collection increases collection efficiency and reduces labor cost through its requirement of using carts. Carts are available in a number of different sizes (32, 64 or 96 gal) and must be provided to residents. Specialized compactor trucks with robotic arms grab the carts and dump the contents into the truck. These systems reduce worker injuries and increase the number of stops that can be completed in each route (between 800 and 1000 stops per route). They also reduce the number of workers to one per route. The labor savings usually more than cover the capital investment for new trucks and carts. One consideration is that automated trucks cannot fit everywhere and are not appropriate for all situations.

The table below summarizes program components and cost estimates for communities in and around Oakland County. Those communities or authorities that have the most control over their programs, have a lower cost along the bottom line. For example, Shelby Township, located in Macomb County, offers a typical program with weekly trash, recycling and yard waste collection; bulky waste collection; and handles customer billing and customer service. In comparison, any of the 12 member communities of SOCRRA would have these same level of services, however, the difference is that SOCRRA owns and operates its own facilities, but also that SOCRRA maintains separate contracts for the disposal of solid waste, processing of composting and recyclables. By managing these components of their programs, SOCRRA is able to keep overall costs down for its members, and also offer revenues from the sale of recyclables. It is not certain that Shelby Township is able to do the same.

TABLE 6. PROGRAM COMPONENTS COMPARISION SUMMARY

	SOCRRA	RRRASOC - SUBURBAN	RRRASOC - RURAL	ROCHESTER HILLS	SHELBY TWP - MACOMB	MACOMB TWP	ANN ARBOR	ANN ARBOR TWP	YPSI TWP	CITY OF YPSI	SUPERIOR TWP
MSW Collection Each Week	✓	✓	✓	✓	✓	✓	✓ (red)	✓	✓	✓	✓
Recycling Collection Weekly	✓	✓	✓	✓	✓	✓	✓			✓ (red)	✓
Recycling Collection Bi-Weekly								✓	✓		
Dual Stream Recycling	✓	✓	✓				✓	✓	✓	✓ (red)	
Single Stream Recyclng				✓	✓	✓					✓
Single Stream Recycle Bank				✓							
Yardwaste	✓	✓	✓	✓	✓	✓	✓	✓ (red)	✓	✓ (red)	✓
Yard Waste w/fall leaf	✓		✓	✓	✓	✓		✓ (red)		✓ (red)	✓
Yardwaste Xmas Trees	✓			✓				✓ (red)		✓ (red)	✓
Yardwate Brush Chipping	✓								✓	✓ (red)	
Source Separated organics (inc. papers food, yard)											
Food Waste											
Bulky Waste	✓	✓	✓	✓	✓	✓			✓	✓	✓
Bulky Recycle (appliance)	✓	✓	✓			✓	✓				✓
Separate Contract: Dual Stream Recyclables Processing	✓ (red)	✓ (red)	✓ (red)				✓ (red)			✓ (red)	
Separate Contract: Single Stream Recyclables Processing											
Separate Contract: Compost Processing	✓ (red)						✓ (red)		✓ (red)	✓ (red)	
Separate Contract: MSW Disposal	✓	✓	✓				✓			✓	
Hauler Handles Billing Direct to Customer				✓	✓	✓		✓			✓
Hauler Handles Customer Service Direct from Customer				✓	✓	✓		✓			✓
Cart Provided for Waste				✓	✓		✓ (red)	✓			✓
Cart Provided for Recycling (64 to 96 gallon)				✓							
Bin Provided for Recycling (14 to 18 gallon)	✓ (red)	✓	✓		✓	✓	✓ (red)	✓	✓	✓ (red)	✓
Multi Family	✓						✓				
PAYT Bag Tag	✓										✓
PAYT Unit Pricing							✓ (red)		✓	✓	✓
Education	✓	✓	✓	✓	✓	✓	✓ (red)		✓	✓ (red)	✓
CONTRACTOR COST PER HH PER YEAR	$110-$135	$ 135	$ 140	$ 185	$ 165	$ 186	*	$ 168	$ 117	$ 84	$ 182

✓ (red) = Services provided by municipality or authority, including facilities.

* = The City of Ann Arbor provides all solid waste and recycling related services with the exception of one contract for the collection and processing of recyclables.

SOLID WASTE SYSTEMS

Communities employ various systems to provide solid waste and recycling services. Which system is in place provides various results as far as increasing recycling and waste diversion, costs to users, cost to operators, and revenue potential. Each system was reviewed and compared to the project goals set forth by the CCIRF communities.

Current practice by the majority of the communities is to allow residents to select their preferred service provider, with no involvement from the local unit of government. This is referred to as the subscription based service model or private sector model. While this system is viewed as an easy choice for communities to employ since no tax dollars are utilized, it does not serve the residents or the community at large very well. Costs are not controlled through competitive bid process, there is a lack of community standards for services, multiple vendor vehicles traveling on streets each day, and typically minimal recycling occurs due to menu pricing structure.

The Preferred Hauler model can be used to increase community standards and manage pricing. Through a competitive bid process, local units select a vendor to provide services. The pricing is published to residents and controlled through contract provisions. Residents then may select the preferred hauler or secure services on their own. While this model may not reduce the number of collection vehicles operating in a community each day, the Preferred Hauler model ensures that desired services are offered by at least one hauler in a community.

Ordinances or licensing programs are typically used in conjunction with a preferred hauler system. Ordinances can also set basic levels of services through requirements of a license to operate in a community, while still relying on private sector resources for funding. Licensing programs can also be used to generate some revenue from fees.

Some communities provide services to residents with their own equipment, vehicles and personnel. Fees for these municipally provided services usually come out of the tax base or through user fees bundled with a utility or water bill. A local unit operating their own program provides a high degree of control over services, and how and where materials are handled (recyclables and waste disposal). Residents do not have any choice and must use services provided, and budgets may be inflated over time, not reflecting modern private sector efficiencies.

Due to the high level of investment for a municipally operated program, many communities opt for a contract services model. Through a competitive bid process, one or more vendors are selected to provide specific services. Through the bid process, costs for services are often reduced by at least 30% compared to subscription based services. These programs typically provide more comprehensive for services and at a lower cost. Fees for contract services model usually come of out the tax base or through user fees on utility billing. This model can also allow for more than one vendor to provide different services. Each service (trash, recycling and yard waste) can be bid together or separate, and may be awarded to more than one vendor. As the buyer of services, communities can specify where solid waste, recyclables, and yard waste should go once collected.

Relative to project goals, the municipal or contract services models would help the CCIRF communities achieve increase recycling and waste diversion, have a minimal need for landfill disposal, help to reduce costs for services, and potentially generate revenue in excess of services. The subscription based model does not achieve any of the goals but is currently the most prominent model being used. The preferred hauler model is attractive because it provides some direction by the local unit, however, does not provide a long-term sustainable approach to managing solid waste and recycling programs.

TABLE 7. SOLID WASTE SYSTEM MODELS VS. CCIRF PROJECT GOALS

Model	Increase Recycling & Waste Diversion	Minimal Landfill Disposal	Reduce Costs for Services	Revenue in Excess of Services
Subscription				
Preferred Hauler	✓			✓
Municipal Services	✓	✓	✓	✓
Contract Services	✓	✓	✓	✓

COOPERATIVE STRUCTURES

As communities build their programs by identifying program components and system models that fit their needs, there is another level of structure that can be explored to continue to strengthen programs and services. Through cooperative structures such as public/private partnerships, inter-local agreements and authorities, local units of government can work jointly to handle their solid waste management responsibilities. All three approaches align with this CCIRF project's goals.

Public/private partnerships are commonly used for communities that wish to enter into contractual arrangements with local private entities to cooperatively finance and/or operate facilities. This approach provides for long-term stable agreements and bundle generators and materials together to achieve large economies of scale. However, there needs to be an oversight and management structure in place to avoid anti-trust laws and ensure deal benefits municipality.

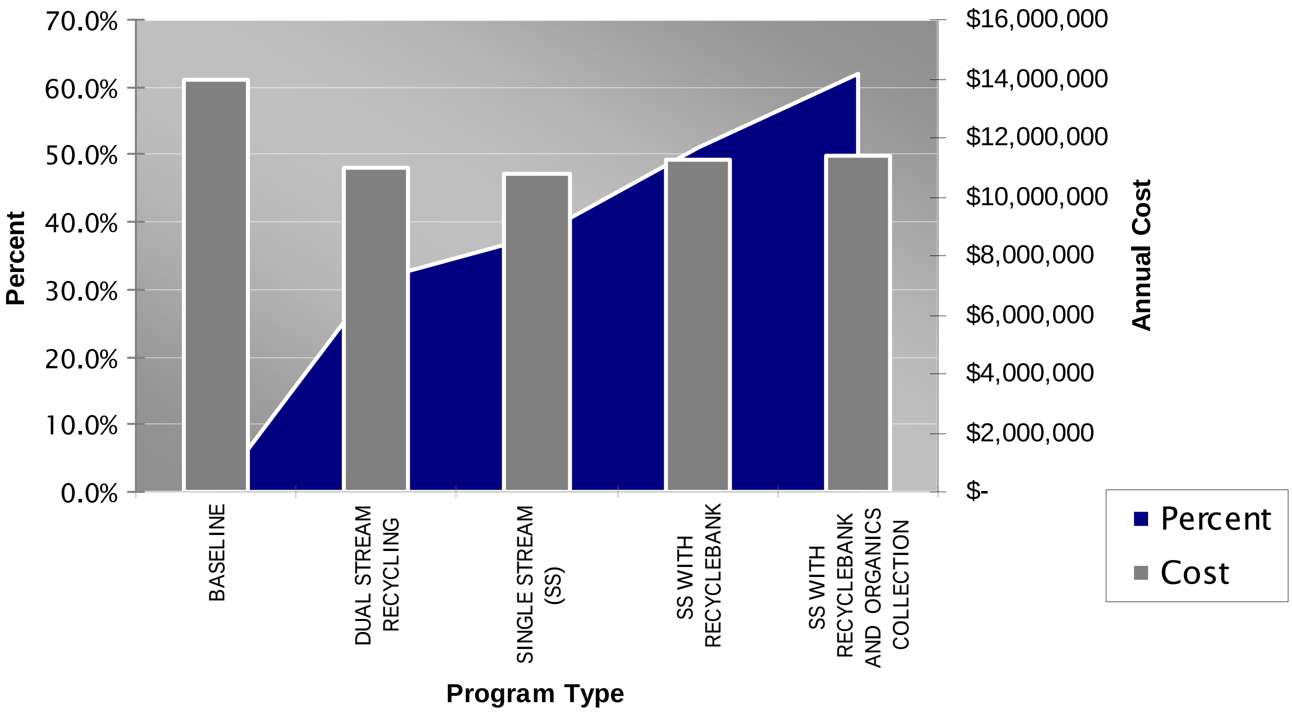
Inter-local agreements are currently in place with the County's No HAZ program. These agreements increase cooperation between municipalities to further increase economies of scale for needed services. While there is not a joint powers decision making body, communities can assign oversight power to the agency most capable to do so.

An authority structure allocates power and responsibility to the various participants in a formal decision making structure. The mechanism for authority legal structure is very flexible and streamlined, providing for very clean contractual arrangements for agreement with local units of government, primarily through membership in an authority By-laws clearly detail administrative procedures to be following, providing a basis for long-term stability. The authority can insulate system decision making from the often more political and sometimes less predictable legislative process of each individual participating local unit.

SUMMARY

There are a number of ways to structure a solid waste and recycling program that will support the next generation of solid waste management and recycling services. For the CCIRF communities to achieve their goals, the contracted services model with a comprehensive level of services should be pursued. As illustrated in chart XX, the status quo provides the most expensive program with the least amount of diversion. As programs build and become more organized, all with the assumption of a contracted services model, diversion increases and prices decrease. To strengthen program and services, the CCIRF communities should pursue a formal cooperative approach that will allow them to leverage their buying power to induce improved collection and processing services while reducing costs for their resident tax payers.

CHART 1. PROGRAM COSTS VS. PERCENT RECOVERY

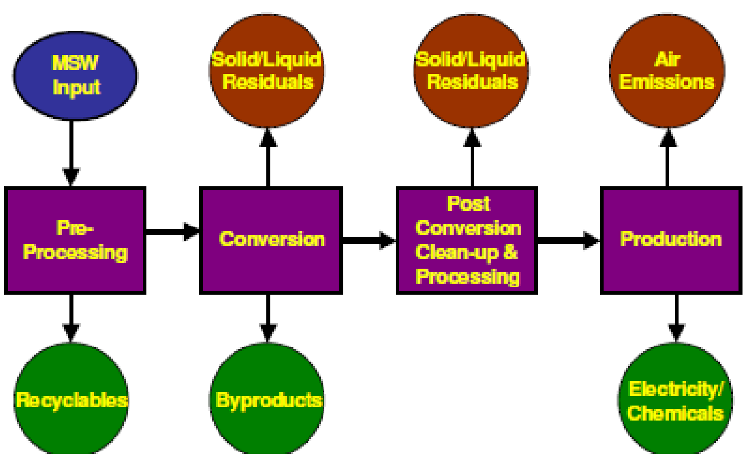


SECTION III
CONVERSION TECHNOLOGIES REVIEW

The following are excerpts from the full Conversion Technology Review prepared by RRS. The full report, with appendices, is contained in Appendix D. Please refer to the full report for additional detail about the process.

OVERIVEW OF ALTERNATIVE MSW PROCESSING TECHNOLOGIES (1**)**
Conversion of municipal solid waste and in particular, organic material can be accomplished by using thermo chemical and biochemical pathways. These descriptions and definitions are described below. Also included is a description of physical technologies that is currently utilized in the US market but is not technically considered a conversion technology.

ANATOMY OF A CONVERSION FACILITY



Thermo-chemical conversion pathways include processes such as pyrolysis, gasification, and plasma arc. Each process can operate within a specific temperature ranging between 700 degrees to 10,000 degrees F. Pyrolysis, gasification, and plasma arc technologies are not new technologies, having been used for coal and other materials since the early twentieth century. However, their application to processing MSW is more recent.

Biochemical conversion processes such as anaerobic digestion and fermentation occur at lower temperatures and have lower reaction rates than thermo-chemical technologies. Higher moisture feedstock is generally better candidates for biochemical processes. Non-biodegradable feedstock, such as plastics and metals, are not suitable feedstock for biochemical conversion and are not converted. Applying biochemical processes to MSW as a pre-treatment step before it is landfilled can reduce both the volume of material being landfilled and the production of leachate.

Physical technologies involve altering the physical characteristics of the MSW feedstock. Typically, materials in MSW may be separated, shredded, and/or dried in a processing facility. The resulting material is referred to as refuse-derived fuel (RDF). It may be pelletized into homogeneous fuel pellets

[1] Evaluation of Alternative Solid Waste Processing Technologies, Prepared for the City of Los Angeles, Department of Public Works, URS Corporation, September 2005.
New and Emerging Conversion Technologies: Report to the Legislature, California Integrated Waste Management Board, June 2007.

and combusted as a supplementary fuel. As stated earlier, physical technologies are not considered alternative or conversion technologies.

HURDLES FOR CONVERSION TECHNOLOGIES

- Next generation of technology is not perfect but better than existing alternatives
- Lack of commercial demonstration in US
- Lack of development/acceptance for certain product markets in US or regulatory hurdles for product use
- Applicability of regulations for environmental permitting is unclear, non-existent, or inadvertently problematic
- Qualification for renewable energy credits for power sale is not consistent
- Need for public education

THERMO-CHEMICAL TECHNOLOGIES

Gasification

Gasification is a process that uses air or oxygen and high heat—typically above 1300°F—to convert feedstock into a synthetic gas or fuel gas either through direct or indirect heating. For direct heating, partial oxidation occurs where the gasification medium is steam and air or oxygen. Indirect heating uses an external heat source such as a hot circulating medium and steam as the gasification medium. Gasification produces a fuel gas (synthesis gas, producer gas), which is principally carbon monoxide, hydrogen, methane, and lighter hydrocarbons in association with carbon dioxide and nitrogen, depending on the process used.

Typical raw materials used in gasification are coal, petroleum-based materials, and organic materials. The feedstock is prepared and fed, in either dry or slurried form, into a sealed reactor chamber called a gasifier. The feedstock is subjected to high heat, pressure, and either an oxygen-rich or oxygen-starved environment within the gasifier. Gasification of MSW is a technology being used in Japan and some countries in Europe.

Pyrolysis

Pyrolysis is a process that can be defined as the thermal decomposition of feedstock at high temperatures (greater than 400°F) in the absence of air. The end product of pyrolysis is a mixture of solids (char), liquids (oxygenated oils), and gases (methane, carbon monoxide, and carbon dioxide) with proportions determined by operating temperature, pressure, oxygen content, and other conditions. Pyrolysis produces pyrolytic oils and fuel gases that can be used directly as boiler fuel or refined for higher quality uses such as engine fuels, chemicals, adhesives, and other products. Solid residues from pyrolysis contain most of the inorganic portion of the feedstock as well as large amounts of solid carbon or char.

Pyrolysis typically occurs at temperatures in the range of 750°F–1500°F and thermo-chemically degrades the feedstock without the addition of air or oxygen. Because air or oxygen is not intentionally introduced or used in the reaction, pyrolysis requires thermal energy that is typically applied indirectly by thermal conduction through the walls of the containment reactor. The reactor is usually filled with an inert gas to aid in heat transfer from the reactor walls and to provide a transport medium for removal of the gaseous products.

The temperature, speed of process, and rate of heat transfer can change the composition of the pyrolytic product. Lower pyrolysis temperatures usually produce more liquid products, and higher temperatures produce more gases. Slow pyrolysis can be used to maximize the yield of solid char and is commonly used to make charcoal from wood feedstock. Fast or “flash” pyrolysis is a process that uses a shorter exposure time to temperatures of approximately 930°F. Typical exposure times for fast pyrolysis are less than one second.

Gases produced during the pyrolysis reaction can be utilized in a separate reaction chamber to produce thermal energy. The thermal energy can be used to produce steam for electricity production. It can be used to heat the pyrolytic reaction chamber or dry the feedstock entering the reaction chamber.

Plasma Arc

Plasma arc technology is a heating method that can be used in both pyrolysis and gasification systems. This technology was developed for the metals industry in the late nineteenth century. Plasma arc technology uses very high temperatures to break down the feedstock into elemental by-products. Plasma arc devices, or “plasma torches,” can be one of two types: the transferred torch, and the non-transferred torch.

The transferred torch creates an electric field between an electrode (the tip of the torch) and the reactor wall or conducting slag bath. When the field strength is sufficiently high, an electric arc is created between the electrode and reactor (much like an automotive spark plug). The non-transferred torch creates the electric arc internal to the torch and sends a process gas (such as air or nitrogen) through the arc, where it is heated, and then leaves the torch as a hot gas. Very high temperatures are created in the ionized plasma (the plasma can reach temperatures of 7000°F and above; the non-ionized gases in the reactor chamber can reach 1700°F–2200°F; and the molten slag is typically around 3000°F).

BIOCHEMICAL TECHNOLOGIES

Anaerobic Digestion

Anaerobic digestion is the bacterial breakdown of biodegradable organic material in the absence of oxygen. It can occur over a wide temperature range, from 50° to 160°F. The temperature of the reaction has a very strong influence on the anaerobic activity, but mesophilic and thermophilic temperature ranges are two optimal temperature ranges in which microbial activity and biogas production rates are highest. Mesophilic systems operate at temperatures around 95°F and the thermophilic systems operate at a temperature around 130°F.

Operation at thermophilic temperature allows for shorter retention time and a higher biogas production rate. However, maintaining the high temperature generally requires an outside heat source because anaerobic bacteria do not generate sufficient heat. These biological processes produce a gas principally composed of methane (CH4) and carbon dioxide (CO2), but gas also has impurities such as hydrogen sulfide (H2S). This gas is produced from feedstock such as sewage sludge, livestock manure, and other wet organic materials.

Anaerobic processes can occur naturally or in a controlled environment such as a biogas plant. In controlled environments, organic materials such as sewage sludge and other relatively wet organic materials, along with various types of bacteria, are put in an airtight container called a digester, where the process occurs. Depending on the waste feedstock and the system design, biogas is typically 55 to 75 percent pure methane, although state-of-the-art systems report producing biogas that is more than 95 percent pure methane. Biogas can be used as fuel for engines, gas turbines, fuel cells, boilers, and industrial heaters. It can also be used in other processes and in the manufacturing of chemicals (with emissions and impacts commensurate with those from natural gas feedstock).

Fermentation

Fermentation is an anaerobic process and is used to produce fuel liquids such as ethanol and other chemicals. This is similar to the process to produce beer and wine. Although fermentation and anaerobic digestion are commonly classified separately, both are fermentation methods designed to produce different products.

Cellulosic feedstock, including the majority of the organic fraction of MSW, must undergo a pretreatment step to break down cellulose and hemicellulose to simple sugars used by the yeast and bacteria for the fermentation process. Pretreatment steps that have been researched include acid hydrolysis and enzymatic hydrolysis.

Cellulosic ethanol processes can be differentiated primarily by the hydrolysis pre-treatment method. Methods that have undergone the most investigation are acid processes, enzymatic hydrolysis, and steam explosion. Acid hydrolysis, and subsequent fermentation, is technologically mature, but no facilities are operating in the United States, and these are essentially unproven technologies from a commercial perspective. Enzymatic processes are projected to have a significant cost advantage once improved but are also commercially unproven.

PHYSICAL TECHNOLOGIES

Refuse Derived Fuel

RDF is produced from MSW in a number of commercial-scale facilities. The MSW is subjected to various physical processes that reduce the quantity of total feedstock, increase its heating value, and provide a feedstock that can be easily handled and fed into on-site and offsite facilities. This results in improved efficiency and reduced ash production in WTE plants. RDF is often used in WTE plants as the primary or supplemental feedstock, or co-fired with coal or other fuels in power plants, in kilns of cement plants, in paper mill boilers, and with other fuels for industrial steam production.

The RDF process typically includes thorough pre-separation of recyclables, shredding, drying, and densification to make a product that is easily handled. Initial processing includes field-based manual picking and removal of white goods and other large ferrous materials. Glass and plastics are removed through manual picking and by commercially available separation devices commonly found in Material Recovery Facilities (MRFs). This is followed by shredding to reduce the size of the remaining feedstock to about eight inches or less, for further processing and handling. Magnetic separators are used to remove ferrous metals.

Eddy-current separators are used for aluminum and other non-ferrous metals. The resulting material contains mostly food wastes, non-separated paper, some plastics (recyclable and non-recyclable), green wastes, wood, and other materials. Reduction of about 50% of the inlet MSW feed can be accomplished through initial RDF processes. Drying to less than 12% moisture is typically accomplished through the use of forced-draft air. Steam from an adjacent boiler can be utilized if RDF is being combusted on-site in a waste-to-energy facility.

Additional sieving and classification equipment may be utilized to increase the removal of contaminants. After drying, the material often undergoes densification processing such as pelletizing or cubing to produce a pellet or cube that can be handled with typical conveying equipment and fed through bunkers and feeders. The RDF can be immediately combusted on-site or transported to another facility for burning alone, or with other fuels. The densification is even more important when RDF is transported off-site to another facility, in order to reduce volumes being transported.

STATUS OF ALTERNATIVE AND CONVERSION TECHNOLOGIES

Although thermal processing and anaerobic digestion technologies are being commercially applied outside the United States, these technologies have limited track record in the United States. However, interest is increasing in the U.S .because the innovative technologies offer certain advantages in comparison to conventional waste-to-energy facilities and landfilling. Most notably, the emission levels from innovative technologies are expected to be less than with conventional waste-to-energy

TABLE 8: EXPERIENCE OF CONVERSION TECHNOLOGY COMPANIES AND REFERENCE FACILITIES, OCTOBER 2008

Experience of Sponsors	Technology							
	Anaerobic Digestion		Gasification		Pyrolysis		Plasma Arc	
	US	Outside US	US	Outside US	US	Outside US	US	Outside US
·Permitting		X		X	X	X		X
·Design		X		X	X	X		X
·Construction		X		X	X	X		X
·Operation		X		X	X	X		X
·Product Marketing		X		X	X	X		X
·Financing		X		X	X	X		X
·Example MSW Reference Facilities								
	ArrowBio Tel Aviv, Israel 50,000 tpy (1 @ 150 tpd) 2003; Sydney,Australia 100,000tpy (2@150 tpd) 2008		**Ebara** Kawaguchi City, Japan 153,300 tpy (3 @ 140 tpd) 2002		**GEM America** South Wales, U.K. 14,600 tpy (1 @ 40 tpd) 2000-2001		**AdaptiveARC** Monterey, Mexico 36,500 tpy (1 @ 100 tpd) 2005	
	Ecocorp Barcelona, Spain 330,000 tpy (900 tpd) 2001		**Entech** Genting, Malaysia 24,500 tpy (67 tpd) 1998		**IES** Romoland, CA 18,250 tpy (1 @ 50 tpd) 2004		**AlterNRG** Utashinai, Japan 109,500 tpy (300 tpd) 2003	
	OWS Vitoria, Spain 120,000 tpy (330 tpd) 2006		**IWT** Kurashiki, Japan 223,400 tpy (3 @ 204 tpd) 2005				**Plasco** Ottawa, Canada 40,150 tpy (1@ 110 tpd) 2007	
	WRSI / Valorga Barcelona, Spain 264,552 tpy (725 tpd) 2004							

The thermal technologies (gasification) and anaerobic digestion produce a combustible synthesis gas or biogas, rather than a solid fuel (MSW). Inherent with the combustion of a gas (compared to combustion of a solid, like MSW), emissions would potentially be lower, particularly for dioxins and heavy metals. Overall, the innovative technologies are also potentially advantageous because they may produce less residuals requiring disposal.

Thermal processing (i.e., gasification) is currently in commercial operation (for MSW) in Japan, Germany, and Italy. Several types of gasification technologies are in commercial operation, including fluid bed gasification, high temperature gasification, plasma gasification and gasification/vitrification.

Anaerobic digestion is currently in commercial operation in Canada, Israel, the Netherlands, Italy, Germany, and other European countries. Anaerobic digestion has not been commercially applied within the United States. Therefore, technology transfer to the United States would need to be addressed in considering commercial application in this country (e.g., MSW composition, waste management practices, end-product markets and regulatory requirements).

TABLE 9: STATUS OF U.S. PUBLIC INITIATIVES CONVERSION TECHNOLOGY, OCTOBER 2008.

U.S. Public Initiatives	Status	Technology			
		Anaerobic Digestion	Gasification	Pyrolysis	Plasma Arc
LA County, California	Request for Offers Issued to Qualified Technology Suppliers; five Responses received 8/08, being evaluated	X	X	X	
City of Los Angeles, California	Proposals received and under review	X	X	X	X
City and County of Santa Barbara, California	Established shortlist of Qualified Technology Suppliers; RFP in preparation	X	X	X	X
City of Sacramento, California	Negotiating Letter of Intent				X
San Jose, California	Request for Information was in progress; current status uncertain				
Salinas Valley, California	NineProposals received;five shortlisted, being evaluated	X	X		X
Santa CruzCounty, California	County consideringoffer for Demonstration Facility; decision expected 11/08				X
City of San Diego, California	Study underway	X	X	X	X
Orange County, California	Procurement underway for consultant to do CT Evaluation	X	X	X	X
NYC, New York	Studies completed; siting underway	X	X	X	X
St. Lucie County, Florida	Permitting				X
Taunton, Massachusetts	RFP released 6/08; Prequalificationsreceived9/08 –16companies; Proposals due 2/09	X	X	X	X
Connecticut Resources Recovery Authority	Second Study underway	X	X	X	X
Delaware Solid Waste Management Authority	Study completed	X	X	X	X
NYC, New York	Studies completed; siting underway	X	X	X	X

Based on success demonstrated outside of the United States by several companies, anaerobic digestion and thermal processing (gasification) technologies could be considered for commercial application in Northern Oakland County, with suitable project definition and risk sharing between the public and the private sponsor.

REGULATORY CONCERNS

Thermal conversion facilities may face the most challenging regulatory hurdles. Current regulations addressing conversion technologies are not clear and contain numerous inconsistencies. New Source Review, NSPS, and air toxics regulations, as described above for advanced thermal recycling, will also pertain to thermal conversion facilities.

Anaerobic facilities may have a relatively clearer regulatory path, in part because these facilities use quite different feedstock, including various forms of biomass, such as green waste and biosolids. Perhaps the most important regulatory hurdle will be meeting the complex regulatory requirements for utilization of compost materials produced from the post-source separated MSW. While anaerobic digestion facilities in Europe generally produce compost that is acceptable for marketing, their feedstock is usually source-separated biowaste.

REQUEST FOR INFORMATION PROCESS

A process was developed to evaluate companies and their associated technologies that could be utilized to process MSW for the communities of Northern Oakland County. The evaluation process included the establishment of goals and evaluation criteria; identification of conversion technology suppliers and/or related project developers; issuance of a Request for Information (RFI) to gather key technical, financial and business information; and application of the evaluation criteria to screen a list of companies that present viable alternatives to landfilling MSW.

The schedule for the RFI and evaluation process was as follows:

Issue Request for Information:	March 6, 2009
Responses Due:	March 27, 2009
Preliminary Evaluation Complete:	April 10, 2009
Selected Technology Vendor Presentations	April 21, 2009 (Oakland County, MI)

CCIRF Project Goals

Increase Diversion of MSW. Any considered technology must increase the diversion of MSW intended for landfill disposal through pre-processing (or post-processing) and/or conversion of MSW into beneficial products such as energy, fuels, or other marketable products (e.g., compost, aggregate, metals).

Reduce Environmental Impacts of Landfilling MSW. Any considered technology must limit and/or mitigate environmental impacts of landfilling MSW, including but not limited to water quality and greenhouse gas emissions.

Provide Financial Feasibility and Sustainability. Any considered technology must have capital and operating costs that result in a feasible, cost-competitive tipping fee, with long-term financial stability that would limit financial impacts to affected ratepayers and possible result in a revenue sharing arrangement with participating communities.

Produce Green Energy and Other Marketable Products. Any considered technology must include a component of green energy and/or fuel production, along with other marketable products, as applicable, such as recovered metals and compost.
Overview of RFI Evaluation

Information submitted was reviewed and evaluated based on the goals and criteria described below to determine the feasibility of a conversion technology project as an alternative to landfilling, and to establish a short-list of technology suppliers determined to be best suited and capable of providing a successful a MSW conversion technology project for Northern Oakland County.

The periods of time for companies to prepare responses and the period of time to review and evaluate responses are both short. Recognizing that limited time will be available to review and evaluate responses, without substantial opportunity for clarification or addendum of information, responding companies were encouraged to submit clear and detailed information.

CCIRF Screening Parameters for Alternative and Conversion Technologies

- The technology must be capable of processing a minimum of 35,000 tons per year of MSW and should be flexible to accommodate additional jurisdictions that may wish to participate in the future. Technologies, which further process a residual or fraction from the waste stream, are not subject to these criteria.
- The technology shall be capable of operating for a minimum of 10 years.
- The amount of residual waste (i.e., material that must be landfilled) produced by the technology shall not exceed 25% (in volume or weight) of the total amount of material (MSW) delivered.
- The technology must be compatible with local solid waste management programs, including planned recycling programs.
- Any considered technology must have a projected tip fee that limits financial impact to affected ratepayers (i.e., no more than 10% beyond the price the ratepayer would expect for other alternatives).
- The technology must produce end products that have probable, identifiable or existing markets.
- The technology must have been demonstrated at a minimum of one facility of similar size and shall have been in operation for at least six months processing MSW or similar feedstock.

- The project management team must provide a financing plan that reasonably demonstrates sources of capital and that it can offer private project financing. If public financing is needed for the project, please identify the preferred financing arrangement and the terms (rate and period) the project would require.
- The feasibility of sharing revenue generated from the sale of the end product produced by the technology.

The RFI process demonstrated that technology suppliers and project developers have an interest in exploring opportunities for potentially developing a conversion technology project for Northern Oakland County. A total of ten responses to the RFI were received from a list of 35 companies. Of these ten, eight responded directly to the RFI questions and two chose to send corporate information but not respond the questions. These two were not considered. The responses included two anaerobic digestion technologies and eight thermal processing technologies.

Based on the evaluation criteria and goals set for this project, four of the technology companies sufficiently met the evaluation criteria and appear to offer the potential for a technically and economically viable conversion technology project for Northern Oakland County. These companies were invited to present their technologies and preliminary business models to the planning group of communities. These four companies warrant further consideration should the decision be made to issue a Request for Proposal. A detailed description of the technologies presented is available in Appendix D.

TABLE 10: SUMMARY OF CCIRF RFI RESPONSES

Category Company	Technology	Invited to Present	Min/Max Waste Volumes	Tip Fee	Demonstration facilities
EcoCorp, Inc. (Project Developer)	Anaerobic digestion of organic materials that produces biogas for heat or power generation or that can be upgraded to natural gas	**YES**	estimated 55% of MSW can be processed via anaerobic process	$11 - $21 tons	13 facilities operating in Europe with the majority in Germany
Recovered Energy Resources, Inc. (Project Developer)	Starved Air Gasifier to produce Syngas that is used to generate electricity	**YES**	Preferred 100 ton/day; Minimums 50 tons/day	not provided	Operated a Gasification waste to energy facility for 15-20 years. Not currently Operating.
Green Power Technologies, Inc (Project Developer)	Mechanical Heat Treatment (mechanical and steam treatment) utilizing an autoclave	**YES**	Scalable based on economics and size of facility;	$30-$40 ton	5 sites in Europe, 2 in US None Operated by Green Power
Greenstar (Project Developer)	Steam autoclave system with a conventional biomass fuel/steam power plant co-located	**YES**	200 tons per day	$30 ton	200 tpd processing and resource recovery plant in Coffs Harbor, Australia
Arrow Ecology (technology and project developer)	two stage anaerobic digestion utilizing microbial decomposition of liquid-phase of organic material at 98.6 degrees		35,000 - 50,000 tons per year per line	$85-$90 to cover project costs for design and build	Plant operating in Tel Aviv since 2003; another plant coming on line in Sydney Australia
CCI US Corporation (technology and project developer)	Anaerobic Digestion of organics		min/max volumes not noted	$50 per ton range depending on whether fee is covering operating or recovery of capital	Plant operating in Toronto since 2002; BTA technology in operation at 35 plants worldwide
International Environmental Solutions (project developer)	Advanced Pyrolysis that produces syngas that is transformed to electricity		modular units can be scaled from 8 TPD to 2000 TPD	Tip fee $40 per ton makes project more viable, assumes electricity sales of $0.10/kwh and carbon offsets	facility located in Riverside County, California operating since 2004 at 40 tons/day
Interstate Waste Technologies (project developer)	Thermoselect pyrolysis and gasification		396 tons per day of waste	Tip fee $60-$65/ton assuming $0.09 - $0.10/kwh	3 facilities operating in Japan
Wilcox Devere	Low Temperature Starved Air Gasification		32 tons/day to 684 tons/day.	$10 - $15 per ton	Sietsma Farms - turkey litter used for power generation, due 6/09; HTI Fuel Testing Facility, due 6/ 09; Upper Michigan
Wilcox Devere	Processed engineered fuel, e.g. refuse derived fuel (RTF)		minimum stream is 78,000 tons/year	$10 - $15 per ton	Northern Lower Michigan (confidential) 100,000 tons per year; Upper Michigan, contracts and financing underway to build a 150,000

NEXT STEPS
Four companies were selected to make presentations, three of which were available to make presentations to the community representatives. All these companies present a potentially feasible approach to managing MSW in Oakland County. Based on an this initial evaluation from the RFI, issuing a Request for Proposals (RFP) for a conversion technology project would be the next step for consideration of alternatives to landfill disposal of MSW in Northern Oakland County. A formal RFP will require companies to submit specific information based on the decision criteria that will be required by participating communities.

Communities will have to make decisions about participation and management. They must decide the consolidation of waste through contractual agreements to gain control of the MWS. Considerations about facility siting, ownership, operations, and financing will also need to be determined.

Under a formal RFP, companies must make present ownership options as part of the operating structure. They will also provide information about a Power Purchase Agreement (PPA) and off-take agreements for other products, a detailed analysis of the environmental impacts and health risks. Companies will have to submit detailed project financial Pro Forma and financing, detailing all operating and revenue assumptions.

Permitting an alternative MSW processing technology will require compliance with a variety of federal, state, county, and local environmental regulations. Each technology group will face different challenges.

A project development plan is an essential part of the project financing: The plan should detail all financial needs as well as all revenues. It should include all projected costs and all projected cash flows. It should lay out, in clear detail, the assumptions of the project. Too often renewable energy projects have a tendency to emphasize the technology over the financial viability of the investment.

Depending on the size of the proposed project, the project sponsor may retain the services of a financial advisor. The advisor will be familiar with the state and county where the project is located and can advise on structures and local conditions as well as having the expertise and contacts to sell the project to the lending banks. The financial advisor will prepare, but seldom accept responsibility for, an information memorandum outlining the nature and economic feasibility of the project, setting out the relevant assumptions relating to the project costs, market prices and demand, exchange rates and so on, together with a profile of each of the project sponsors.

Once the project structure has been approved, the project sponsors will negotiate more detailed terms and conditions for the financing and sign a terms sheet, which will form the basis for the legal documents. A bank, lender or bond underwriter usually will require an independent review of the project assumptions and environmental compliance. This is often referred to as due diligence. The intent of business due diligence is to verify the potential of the deals that survive the initial screening. Often

the criteria which are evaluated are similar to those explored in the initial screening criteria but in greater depth.
From a legal standpoint, due diligence is commonly understood as a defense against securities fraud claims predicated on false or misleading disclosure documents prepared in connection with the public sale of securities. Due diligence is generally designed to ascertain the economic values and results of operations and then to express them in financial terms. The general objective is to find, identify, and estimate the impact of the purchase price or investment conditions.

One of the key issues is the verification of the revenue streams including power purchase agreements, off-take contracts, and MSW tip fees. The power purchase agreement (PPA) establishes the power sales obligations between the private producer and the power purchaser. Because the PPA usually provides the only revenue stream for repayment of debt and return to investors, it is important to the lender. The task of establishing specific performance guarantees, future adjustments to the power tariff, and penalties or bonuses for exceeding or failing to meet performance guarantees are the heart of the PPA and usually require lengthy discussions.

The most important issue for financing a project is a guaranteed, suitable waste supply provided at a tipping fee sufficient to support a project. A guaranteed waste supply will be critical to the ability to finance any project. Generally, a waste management project that includes the assurance of long-term waste supply and payment of tipping fees through a contract from a governmental entity can get financing.

All of the various contractual arrangements and key agreements, contracts and government undertakings that seek to reduce the lenders' and investors' risk by establishing legally binding obligations, financial structures, and operational procedures are known as the Security Package. The main agreements that make up the Security Package include, among others, the following:

- Implementation agreement
- Power purchase agreement
- Land conveyance agreement
- Ownership structure and agreements
- Equipment and fuel supply (if any) agreements
- Construction contract
- Technology Performance Guarantees
- Operation and maintenance agreement.

While the numerous issues identified above need to be addressed as a financing is being structured, these are resolvable at the project level by applying industry standard approaches (e.g., proven technology, demonstrated environmental benefits, experienced constructors and operators, strong off-take contracts, corporate guarantees, security instruments such as bonds and insurance coverage). Based on success demonstrated outside of the United States by several companies, anaerobic digestion and thermal processing (gasification) technologies could be considered for commercial application in northern Oakland County, with suitable project definition and risk sharing between the public and the private sponsor.

SECTION IV
POTENTIAL PARTNER EVALUATION

PARTNER IDENTIFICATION

The communities of northern Oakland County vary with different levels of trash and recycling services. However, despite these variations, there are many communities that would make a natural fit into any future cooperative arrangement, such as an authority. Many currently do not coordinate these services but, along with the project communities, should be able to make a smooth transition to community-wide contracted services. Those with contracts could be phased in as the project group progresses with any long term plans to pursue a conversion technology facility, or to gain greater efficiencies in collection costs, processing costs, and potential recycling revenue streams. There are three categories of communities to consider.

The first likely group of communities to consider for participation is the members of No HAZ. These 15 communities already utilize a cooperative arrangement to secure services and recognize the benefits of doing so. Three No HAZ members participated in this study (Groveland, Waterford, and White Lake). Of the remaining communities, five currently do not offer coordinated services to their residents, while seven do contract for services.

Geography also plays a role in identifying communities to be considered for a cooperative structure. These communities are near the CCIRF group, but do not participate in No HAZ. Both Ortonville and Clarkston are located in two of the CCIRF townships. Since both have subscription based services, and if the surrounding townships proceed as an authority, it would be recommended that these communities participate. The group consists of both townships and villages, with both types of services (subscription or contracts).

Finally, there are communities that could participate in a northern Oakland County authority or also could be served by either RRRASOC or SOCRRA on the southern end of the County. If a conversion technology facility is pursued, these communities may provide additional tonnage to contribute to such a facility. Bingham Farms and Franklin are close to both existing regional authorities, and materials from these communities may already be flowing into those facilities. Bloomfield Hills' location and population density make its desirable for existing or proposed authorities and currently operates under subscription based services with licensed haulers. This group is identified as "Potential" in Table 8.

TABLE 11. SUMMARY OF SOLID WASTE SYSTEMS IN NON-CCIRF OAKLAND COUNTY COMMUNITIES

	Group	Subscription	Contract	Vendor	Contract End Date
Addison Twp	No HAZ	X			
Commerce Twp	No HAZ		X	Republic	N/A
Lake Angelus	No HAZ	X			
Lake Orion	No HAZ		X	Waste-A-Way	6/2010
Leonard	No HAZ		X	Sunrise	12/2010
Oakland	No HAZ	X			
Orion	No HAZ	X			
Oxford	No HAZ		X	Waste Management	N/A
Oxford Twp	No HAZ	X			
Rochester	No HAZ		X	Richfield	N/A
Rochester Hills	No HAZ		X	Allied	N/A
Wolverine Lake	No HAZ		X	Waste Management	12/2008
Auburn Hills	Geography	X			
Clarkston	Geography	X			
Highland Twp	Geography		X		
Holly	Geography		X	Allied	
Holly Twp	Geography	X			
Ortonville	Geography	X			
Pontiac	Geography		X	Veolia	
Rose Twp	Geography	X			
Bingham Farms	Potential		X	Car Trucking	
Bloomfield Hills	Potential	X			
Franklin	Potential		X	Waste Management	6/2011
Lyon Twp	Potential	X			
Milford	Potential		X	Waste Management	6/2012
Milford Twp	Potential		X	Richfield	

WASTE GENERATION FOR POTENTIAL PARTNERS

As stated in the Current Conditions Overview, solid waste and recycling data is not actively collected or provided. In order to make recommendations for this study, waste generation and potential diversion rates were projected for each community based on nation-wide averages and local data from similar sized communities. Population data was obtained from SEMCOG, although despite recent trends in Michigan's economy, shows population steadily increasing, when if fact, this may not be accurate. The following table offers projections with the assumption that recycling is being diverted through a dual-stream method (fiber collected separated from plastic, metal and glass recyclables) and that some yard waste is being collected on a weekly basis seasonally (usually April through November).

TABLE 12. POTENTIAL TOTAL WASTE GENERATION FOR PARTNERS

COMMUNITIES	Population	Households Single Family	TOTAL TONS
CCIRF TOWNSHIPS	233,911	69,663	94,918
NO HAZ	136,073	50,357	47,094
GEOGRAPHY	125,035	46,737	43,709
OTHERS	34,220	12,338	11,539
TOTAL	529,239	179,095	197,260

SECTION V
EVALUATION OF RECOMMENDATIONS

CONCLUSIONS AND RECOMMENDATIONS

The communities spent an entire meeting reviewing, discussing and vetting out the broad preliminary recommendations found below:

Preliminary Recommendations

- These communities should pursue a formal cooperative approach that will allow them to leverage their buying power to induce improved collection and processing services and reduce costs for their resident taxpayers.
- Municipally organized and contracted services should be developed to gain a range of new services, reduce taxpayer cost and to support development of alternatives to landfilling.
- The determination of ultimate viability of conversion technologies can only be and should be answered with marketplace testing through a bona fide procurement process.
- These communities should continue uninterrupted in pursuing the benefits of cooperation with the creation of a cooperative structure and the development of a transition plan that accommodates identified keystones to system development.

Based on these discussions and on a further integrated review of the conversion technologies, another meeting was held and a decisive discussion was conducted to evaluate and ultimately fully support the conclusions and recommendations that follow.

Community Needs

The three main questions the participating communities wanted to answer as a result of this study have answers that are both definitive and yet still will require a decision and commitment on the part of the communities to continue with this project to provide a detailed answer.

1) *Are there efficiencies in these communities working together?* Experience in Oakland County, in Michigan and across the country has shown that communities that cooperate to develop services benefit from economies of scale, market position, and shared administration and educational costs that result in lower rates and a high degree of service, along with the ability to adapt to changing practices and requirements. These communities have indicated a willingness to develop a specific organizational form that will allow them to capture those efficiencies. Additionally, these communities along with others adjacent have a history of cooperation through the NO HAZ program, and all will continue to benefit as long as membership is shared and willingly accepted with a focus on service waste service delivery.

2) *What systems can increase recycling and waste diversion in these communities?* Community wide collection systems combined with locally available processing options and the contractual ability to provide incentives, ensure service standards and to negotiate revenue sharing are proven top performers in landfill diversion. The ability to leverage the contracted waste stream to encourage investment in processing and collection technology can also be crucial at time. The ability to access emerging single stream recycling, incentives, and advanced composting technologies will improve diversion and are comparatively simple for residents to participate in.

3) *Are conversion technologies feasible?* The answer here is a definitive maybe. Just as clear as some of these emerging technologies reliability and functionality is improving, landfill rates are extremely low and space is plentiful. The rigor that can be imposed and the confidence that can be drawn from the RFI process indicates that at a potentially premium price point, or on a limited waste stream (i.e.-yard waste only) it is possible that some of these conversion technologies are feasible, or could become feasible with our evolving energy and commodity marketplace. In any event, regulatory, siting, financing and due diligence considerations place the conversion technologies on a longer development cycle than the clear advantages accessible through cooperation in the immediate term.

Cost and Revenues

Building on the original tonnage and service projections, RRS prepared a new system cost projection that used costs provided by the RFI submissions, along with some scenarios for recyclables and organic materials revenues. A project memo including the different scenarios is attached as Appendix A. The significant consideration below is how extremely variable the feasibility of the more aggressive conversion approaches are compared to the relatively low cost and predictability from a proven recycling/composting program. As recycling revenues increase, the relative cost of conversion technologies and recycling incentives improve dramatically. The low cost solution in the best market is one that combines a recycling incentive program with advanced anaerobic composting. The potential for power generation revenues to increase this variability is possible, but unknown.

TABLE 1. SYSTEM COSTS @ $35 PER TON TIP FEE (CONVERSION TECHNOLOGY) WITH REVENUE ESTIMATES

	REVENUE - LOW			REVENUE - MEDIUM			REVENUE - HIGH		
Townships	REVENUE TOTAL	REVENUE PER HSHLD	NET COST PER HSHLD	REVENUE TOTAL	REVENUE PER HSHLD	NET COST PER HSHLD	REVENUE TOTAL	REVENUE PER HSHLD	NET COST PER HSHLD
BASELINE	$ -	$ -	$ 200.00	$ -	$ -	$ 200.00	$ -	$ -	$ 200.00
DUAL STREAM RECYCLING	$ 586,869	$ 8.42	$ 146.05	$ 1,036,666	$ 14.88	$ 139.59	$ 1,730,465	$ 24.84	$ 129.63
SINGLE STREAM (SS)	$ 777,199	$ 11.16	$ 140.89	$ 1,428,307	$ 20.50	$ 131.54	$ 2,489,056	$ 35.73	$ 116.32
SS WITH RECYCLEBANK	$ 1,143,302	$ 16.41	$ 142.47	$ 2,181,635	$ 31.32	$ 127.56	$ 3,948,218	$ 56.68	$ 102.20
SS WITH RECYCLEBANK AND ORGANICS COLLECTION	$ 1,300,044	$ 18.66	$ 142.13	$ 2,416,748	$ 34.69	$ 126.10	$ 4,261,701	$ 61.18	$ 99.62
CONVERSION TECHNOLOGY	$ 2,016,903	$ 28.95	$ 161.88	$ 3,141,465	$ 45.10	$ 145.74	$ 5,342,527	$ 76.69	$ 114.14

Conversion Technology Tip Fee=$35.00 per Ton

Conversion Technology Collection Cost = $10.75 per Month

Recommendations

The CCIRF communities should begin work to finalize the details of a solid waste authority with:

- the authorization to seek services on behalf of its founding communities. The formation and operation of an authority in the near term will also greatly benefit the ability to request and receive legitimate pricing in any procurement process.
- Included in this development should be outreach to adjacent communities which have expressed an interest.

The CCIRF communities should begin work on the specifics of a community wide hauling contract and procurement specifications.

- Specifications will detail important items such as service levels desired within each community, the creation of service zones for specific services, procurement preferences or requirements of the communities, any use of automated collection or incentives, and service procurement order and calendar.
- Develop an implementation schedule based on existing agreements and procurement requirements.
- A transitional service would be developed with an eye toward moving to a conversion technology, when and if feasible.

The CCIRF communities should request proposals from conversion technologists.

- As part of the proposed procurement process, evaluate for viability and desirability to conduct due diligence activities.
- Narrowing the field to not more than two.
- Begin specific negotiations around location and siting timeframe, price point and materials guarantees, and financing in a controlled and actionable environment.

Recommendations

The CCIRF communities should begin work to finalize the details of a solid waste authority with the authorization to seek services on behalf of its founding communities. Significant procurement flexibility, lower cost and ease of management, and a familiarity with working authorities in solid waste and allied fields make this the preferred mechanism for developing the program. The formation and operation of an authority in the near term will also greatly benefit the ability to request and receive legitimate pricing in any procurement process. Included in this development should be the outreach to adjacent communities which have expressed an interest or that could benefit and contribute through membership in the new authority.

The CCIRF communities should begin work on the specifics of a community wide hauling contract and procurement specification. Such specifications will detail important items such as service levels desired within each community, the creation of service zones for specific services, procurement preferences or requirements of the communities, any use of automated collection or incentives, and service procurement order and calendar, and an implementation schedule based on existing agreements and procurement requirements. A transitional service would be developed with an eye toward moving to a conversion technology, when and if feasible.

As part of the proposed procurement process, the CCIRF communities should request proposals from conversion technologists and evaluate for viability and desirability to conduct due diligence activities, narrowing the field to not more than two and begin specific negotiations around location and siting timeframe, price point and materials guarantees, and financing in a controlled and actionable environment.

A more detailed set of implementation steps is included in Appendix G. A transitional service agreement(s) that provides an option for a shorter (i.e. 3 years) term would be developed, initially. This will allow for community acquaintance with the program, an opportunity for program contract adjustments, and the potential of moving to a conversion technology if deemed desirable. A general time frame for implementation follows:

June/July-	present findings to member Boards
July/August	prepare Authority Articles and By Laws and present to Boards
July-September	prepare procurement specifications and calendar
August/September	conduct outreach and briefings to potential members
October/December	conduct procurement and evaluation
December	prepare transition plan for service implementations
September-Spring ’10	conduct municipal activities to authorize membership, service contracting
October-Spring ’10	conduct conversion technology due diligence/negotiations as required
Spring ’10	begin community wide services
Spring ’13	begin new community wide service agreement

APPENDICES