Organics Management Straw Proposals Assumptions

1. All proposals will support the existing Minnesota waste hierarchy.
2. All efforts have been made to reduce organics waste generation.
3. All efforts have been made to redirect food to people first, then animals.
4. The consequences of any proposal will include an evaluation and understanding of that proposal on other systems and infrastructure already in operation.
5. Regardless of the approach, education is key to success.
6. How a revised system is implemented will depend on what straw proposals are adopted.
7. Use of biodegradable items will improve what is collected for composting.
8. Financial mechanisms should be equitably available and applied.

3.1 POLICY/LEGISLATION

3.1a	**Public Entity Source-Separated Organic Waste Diversion**
Description	Take first step by mandating that public entities source-separate organic wastes. Portions of this waste could be directed to various management methods (ie. Food to Humans/animals, Composting, digestion, bioreactor, gasification etc.).
Measurement Method	Some data exists at the county level in SCORE reporting, but a thorough evaluation of measurement method would be necessary, especially in capturing data from generators, which would provide the clearest picture of how entities are managing the entire waste stream.
Timeframe/Mileposts	Needs to be developed.
Implementation Parties	State Government Buildings. Local Government buildings. School districts. Libraries. Jails/Prisons. Publicly sponsored events. Need to define the types of buildings—might be appropriate for buildings with food services, but not for general office buildings, etc.
Costs	Increased costs on public entities mandated to participate. There may be increased costs or savings for public entities depending on the particular system implemented.
Funding Mechanisms	SCORE, Solid Waste Tax if necessary.
Barriers/Issues	Funding to cover increased costs would be an issue. Education efforts would need to be in place to direct behavior change. Additional hauling and hauling distances may be an additional GHG contributor.
Opportunities	Public entities would be able to implement more quickly than commercial and residential. If implemented, a sizeable volume of organic waste would be available to evaluate different end-uses and management options. This experience would provide a good case study of what works and doesn't work in this system.
Feasibility	
General Comments	There is some existing information from places where this is already happening (MPCA bldg, Schools, etc.) that could be useful in developing this policy.

Centroid Information	Twin Cities	Duluth	St. Cloud	Rochester	Total
Cumulative GHG Reduction Potential					
Priority					
Centroid-Specific Comments					

3.1b	Target Organic Rich Commercial and Institution Generators
Description	Define and Target "Organic Rich" Commercial and Institutional Generators and Require Separate Management of Food Waste and Organics by any or all methods: reduction, food to hogs or composting, etc Includes organizations like Xcel Center, Target Center, et. Ban use of food grinders
Measurement Method	
Timeframe/Mileposts	
Implementation Parties	MCES identify large uses, MPCA, Counties, private sector
Costs	Comparable to recycling costs Depends on garbage costs, maybe cost savings for some
Funding Mechanisms	SCORE
Barriers/Issues	-Need to determine standard requirement method, legislative mandate, licensing requirement, etc -Enforcement -Space -Training of employees -Potential to impact waste hauler service level -Additional reporting and review needed
Opportunities	-Remaining msw becomes more visible and possible to reduce service and cost levels -SWMT tax savings -Increase worker safety & productivity -Increase "green" appeal -Possible increase of private sector service opportunities
Feasibility	Very feasible. Need to increase resources to develop program elements and provide assistance and education to entities.
General Comments	Examine financial incentives both at state and local levels, SWMT, county service charges

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Priority					
Centroid-Specific Comments					

3.1c	Residential sector, Co- collection of Food waste/organics with yard waste				
Description	Many cities throughout the United States and Canada have proven that food waste/non-recyclable paper can be efficiently co-collected using the existing yard waste collection system and managed effectively at a composting facility. Based on the experience of the Carver County co-collection organics project, if all of the approximately 800,000 households in the Metro region with curbside trash collection were provided with organics collection, an additional 27,000 to 77,000 tons of organics could be diverted from the trash.				
Measurement Method					
Timeframe/Mileposts	There are currently two organics waste demonstration projects in the Metro area managing co-collected residential yard waste and organics. The MPCA is reviewing additional requests for new organics composting sites which could be in operation in 2009. Many cities in the metropolitan area have requested residential organics collections service for their residents.				
Implementation Parties	Regional and local governments, waste service providers, compost site owner/operators, MPCA				
Costs	-possible low collection costs by co-collection of existing yard waste routes it eliminates the need for an additional truck. - hauler can utilize existing yard waste carts so no new organics carts may be necessary Residents who choose to utilize bags can not use plastic bags. The must purchase biodegradable bags which at this time are more expensive. -possible increase cost due compost facility location, type				
Funding Mechanisms					
Barriers/Issues	-Limited compost facility capacity -Potential issue in siting new compost sites -Collection during winter months. In the Carver County program organics are collected every other week and delivered to the compost site which operates year round. -Plastic bags -Perception and sorting -MCPA guidance on facility requirements needed				
Opportunities	-Reduce frequency of garbage pickup or size of container - efficiencies and lowered cost of service when residential organics are collected and composted with yard waste at yard waste composting sites specifically setup for mixed organics				
Feasibility	Proven technology				
General Comments	Food waste and other organics in a landfill setting are the major contributors to landfill methane generation. Methane is 23 times more potent than carbon dioxide as a greenhouse gas. The strength of leachate is also increased by the presence of food waste and other organics in a landfill and food waste going down in-sink garbage disposals add to the BOD and phosphorus content of wastewater.				
Centroid Information	**Twin Cities**	**Duluth**	**St. Cloud**	**Rochester**	**Total**
Cumulative GHG Reduction Potential					

Priority					
Centroid-Specific Comments					

3.1d	**Generator Organics Disposal Ban by 2015**				
Description	By 2015, residential and commercial and institutional generators will not be allowed to place food waste and organic materials into the trash. Phase in approach with diversion goals and progress measured. Start with commercial and institutional. Evaluate best practices for residential and evaluate by 2012				
Measurement Method					
Timeframe/Mileposts					
Implementation Parties	MCES, MPCA, Counties, cities, private sector				
Costs	Depends on food waste/organics program. Many comparable to recycling costs Depends on level of garbage costs, maybe cost savings for some				
Funding Mechanisms	SCORE				
Barriers/Issues	-Residential –apartment buildings, collection, ghg impacts -Commercial –requiring all, or only "organic rich", space, training employees, additional government requirement -Development of program, definitions, implementation, enforcement -trash contracts -Compost rule/MPCA facility guidance				
Opportunities	-Remaining msw becomes more visible and service levels maybe reduced, odors reduced -funding incentives, service charges, swmt savings -Increase worker safety and productivity -Increase "green appeal" -Possible increase in private sector service opportunities				
Feasibility	Review and determine whether through hauler licensing programs requirements for organics collection can be implemented.				
General Comments					
Centroid Information	**Twin Cities**	**Duluth**	**St. Cloud**	**Rochester**	**Total**
Cumulative GHG Reduction Potential					
Priority					
Centroid-Specific Comments					

3.1e	Refinement of the definition of Source Separated Compostable Materials (MN Stat. §115A.03, subd. 32b?) is needed				
Description	Current State law contains the following definition: 115A.03 Subd. 32a. **Source-separated compostable materials.** "Source-separated compostable materials" means materials that: (1) are separated at the source by waste generators for the purpose of preparing them for use as compost; (2) are collected separately from mixed municipal solid waste, and are governed by the licensing provisions of section 115A.93; (3) are comprised of food wastes, fish and animal waste, plant materials, diapers, sanitary products, and paper that is not recyclable because the commissioner has determined that no other person is willing to accept the paper for recycling; (4) are delivered to a facility to undergo controlled microbial degradation to yield a humus-like product meeting the agency's class I or class II, or equivalent, compost standards and where process residues do not exceed 15 percent by weight of the total material delivered to the facility; and (5) may be delivered to a transfer station, mixed municipal solid waste processing facility, or recycling facility only for the purposes of composting or transfer to a composting facility, unless the commissioner determines that no other person is willing to accept the materials. There was discussion amongst the SubGroup that this definition may need revised. The discussion included the need to redefine organics diversion as recycling.				
Measurement Method	Change in statute if determined a change is needed				
Timeframe/Mileposts	2010 legislative session				
Potential Implementation Parties	Agency, Stakeholders, legislators, Governor				
Costs	Zero				
Funding Mechanisms	Non-needed				
Barriers/Issues	Lack of buy-in by all stakeholders Moves composting up on the waste hierarchy				
Opportunities	Make reusing and recycling organic materials easier.				
Feasibility					
General Comments					
Centroid Information	**Twin Cities**	**Duluth**	**St. Cloud**	**Rochester**	**Total**
Cumulative GHG Reduction Potential					
Priority					
Centroid-Specific Comments					

3.2 FINANCIAL INCENTIVES

3.2a	Financial Viability				
Description	Financial viability is key to the long-term viability of all straw proposals. Funding mechanisms identified include: a. Incentives such as tax credits b. More heavily tax materials that are landfilled c. Grants, low-interest loans d. Carbon credit generation e. Subsidy f. Market factors alone g. Market factors in combination with other incentives or taxes				
Measurement Method					
Timeframe/Mileposts					
Potential Implementation Parties					
Costs					
Funding Mechanisms					
Barriers/Issues					
Opportunities					
Feasibility					
General Comments					
Centroid Information	**Twin Cities**	**Duluth**	**St. Cloud**	**Rochester**	**Total**
Cumulative GHG Reduction Potential					
Priority					
Centroid-Specific Comments					

3.3 EDUCATION AND OUTREACH

3.4 REGULATION AND PERMITTING

3.4a	**Revise the MPCA rules for permitting source separated organics composting facilities and clarifiy the definition(s) of organic materials.**				
Description	Develop an updated rule for SSOM composting facility siting, design, operation and performance standards that protect air and surface and groundwater but do not make siting and operation of such facilities cost prohibitive.				
Measurement Method					
Timeframe/Mileposts	Develop a Guidance document and/or engage the Emergency Rule Making Authority so that the rule revision process does not prevent the implementation of programs. Rule revision process to be completed by January 31, 2011				
Implementation Parties	MPCA in conjunction with County staff				
Costs	$85,000				
Funding Mechanisms	Funded by the MPCA				
Barriers/Issues	Protecting the environment, change based on scientific data including Demonstration projects				
Opportunities	Rule revision will help promote for profit company interest in processing SSOM.				
Feasibility	Highly feasible. Need is already identified. Effort is already underway.				
General Comments					
Centroid Information	**Twin Cities**	**Duluth**	**St. Cloud**	**Rochester**	**Total**
Cumulative GHG Reduction Potential					
Priority					
Centroid-Specific Comments					

3.5 COLLECTION AND PROCESSING

3.5a	Organized Collection				
Description	Implement organized collection of Source Separated Organic Materials (SSOM) in municipalities to require and implement the recovery of organics. This would create the densities of materials to make collection programs more affordable, as well as to provide opportunities for all residents to participate. Municipalities would also have the pricing controls to then incentivize the diversion of SSOM out of the garbage can and into an organics container.				
Measurement Method	In organized collection programs, reporting of all materials collected would/could be a requirement of all contracts allowing for accurate measurement of tons captured.				
Timeframe/Mileposts	• Currently the process to follow the organized collection statute takes a municipality approximately one year to complete				
Potential Implementation Parties	MPCA, MN Dept of Commerce (Office of Energy Security), regional/local governments (counties, SWMCB, WLSSD, economic development agencies, cities and townships), private haulers.				
Costs	Low costs/medium costs. Legal and administrative costs paid by municipalities to follow the current mandated organizing statute process. However, must recognize that it is transferring costs currently paid by residents directly to their hauler to the local unit of government to pay. Per household costs generally are less in organized programs than under non-organized collection programs.				
Funding Mechanisms	This is usually done through either property tax or service fee increases.				
Barriers/Issues	• Private haulers strongly oppose organized collections. It limits their opportunities to compete. Spent years building their businesses under a open hauling system and have built their business models accordingly • Residents like the ability to choose for themselves who will be their hauler. Creates political issues for city councils, etc.				
Opportunities	• Creates opportunity to provide community wide education about the program • Can increase overall capture of materials by providing consistent service to all residents. • Can provide for multiple haulers to provide services by splitting cities into regions or allowing different haulers to collect each stream.				
Feasibility	Very feasible but politically sensitive				
General Comments	The organized collection process is quite long and onerous for all parties involved				
Centroid Information	**Twin Cities**	**Duluth**	**St. Cloud**	**Rochester**	**Total**
Cumulative GHG Reduction Potential					
Priority					
Centroid-Specific Comments					

3.5b	Establish System for Transfer of SSOM				
Description	Within Centroids create a system of drop-off locations for SSOM that facilitate the collection of materials from small generators or with inadequate densities for collection. Also allow Material Recycling Facilities (MRF's) to accept, set aside, and transfer SSOM under their current permit-by-rule requirements.				
Measurement Method	Reported tons of organics diverted at MRF's and drop-off locations would be a requirement of the permits				
Timeframe/Mileposts	Modify or create new rules in order to permit MRF's to accept and transfer SSOM - 2011 License/construct/operate first municipal/regional SSOM drop-off locations - 2011				
Potential Implementation Parties	MPCA, MN Dept. of Commerce (Energy Security Office), regional/local governments (counties, SWMCB, WLSSD, economic development agencies, etc.), private MRF operators.				
Costs	Low capital costs to modify existing facilities to accept materials				
Funding Mechanisms	Solid waste fees/taxes on MSW disposal/processing facilities, state/federal grants, tipping fee at facility.				
Barriers/Issues	• Creating a sustainable infrastructure for the collection of source-separated organics. • Need to develop more regional compost sites to minimize transportation costs of collected materials to processing sites • Will require revising MPCA rules for permitting such facilities. • Public opposition to such facilities may be a problem.				
Opportunities	• Utilizes current infrastructure to facilitate the collection and movement of SSOM • Creates options for small generators and rural communities to provide access to those interested in self hauling				
Feasibility	Technically feasible				
General Comments	Would need to consider what additional permitting requirements are necessary to ensure public health				
Centroid Information	**Twin Cities**	**Duluth**	**St. Cloud**	**Rochester**	**Total**
Cumulative GHG Reduction Potential					
Priority					
Centroid-Specific Comments					

3.5c	Collect Organics Under Same Rules as Recycling Collection				
Description	Require that residents of MN be provided the same assurance of access to SSOM collection programs that govern the provision of recycling services (115.552). Additionally SSOM should be exempted from all state and local solid waste management taxes, and the collection of SSOM would be exempt from the organized collection statute.				
Measurement Method					
Timeframe/Mileposts	Will require change in State Statute and MPCA rules - 2011				
Potential Implementation Parties	MPCA, MN Dept of Commerce (Office of Energy Security), regional/local governments (counties, SWMCB, WLSSD, economic development agencies, cities and townships), private haulers.				
Costs	Medium/high costs. Municipalities and/or counties would be required to implement the collection of SSOM, either through contracted services or through licensing requirements of haulers within their jurisdiction. There would also be a loss of solid waste management tax revenue to the state and local units of government for the newly exempted materials that would now be collected as SSOM.				
Funding Mechanisms	This is usually done through either property tax or service fee increases, or through increased SCORE Funding to counties and local units of government.				
Barriers/Issues	• Private haulers strongly oppose contracted collections. It limits their opportunities to compete. Spent years building their businesses under a open hauling system and have built their business models accordingly • Unfunded mandate unless significant new funds are provided to municipalities • Higher collection costs to the generator for collection and separation but potential savings in avoided disposal costs if they are a large generator of SSOM. • Loss of revenue to state				
Opportunities	• Can increase overall capture of materials by providing consistent service to all residents • Can provide for multiple haulers to provide services by splitting cities into regions or allowing different haulers to collect each stream. • Expedites implementation • Creates opportunity to provide community wide education about the program				
Feasibility	Very feasible but politically sensitive				
General Comments					
Centroid Information	**Twin Cities**	**Duluth**	**St. Cloud**	**Rochester**	**Total**
Cumulative GHG Reduction Potential					
Priority					
Centroid-Specific Comments					

3.5d	Co-Collection				
Description	Remove any regulatory requirements or restrictions that limit or prohibit the co-collection of SSOM. Allow for the co-collection of SSOM either along with yard waste, and/or promote the collection of SSOM with the same vehicle but in separate compartments from other streams of collected materials (ie. yard-waste, recyclables, refuse)				
Measurement Method					
Timeframe/Mileposts	• Will require change in State Statute and MPCA rules - 2011				
Potential Implementation Parties	MPCA, regional/local governments (counties, SWMCB, WLSSD), private and public landfill owners, electrical utilities, other potential energy markets, etc.				
Costs	none				
Funding Mechanisms					
Barriers/Issues	• Will require developing new MPCA rules for easing the operator in permitting such facilities. WLSSD now has this kind of facility permit. • Yard-waste collection is not a year-round service so may have some issues regarding year-round separation and collection of SSOM • Collection vehicles that must be purchased.				
Opportunities	• Allows for additional opportunities to collect with low marginal costs				
Feasibility	Technically feasible on a demonstration project basis. No long term operating experience.				
General Comments					
Centroid Information	**Twin Cities**	**Duluth**	**St. Cloud**	**Rochester**	**Total**
Cumulative GHG Reduction Potential					
Priority					
Centroid-Specific Comments					

3.5e	New Licensing Requirements and City Ordinances				
Description	Cities would pass ordinances that mandate SSOM collections for their residents. This will allow haulers in the market to decide if they want to compete or these services. Another mechanism is to require all licensed haulers to provide SSOM collection services as a condition of licensing.				
Measurement Method	Requirement of licensing would be annual reporting of materials collected				
Timeframe/Mileposts					
Potential Implementation Parties	Regional/local governments (counties, SWMCB, WLSSD, economic development agencies, cities and townships), private haulers.				
Costs	Low costs. Municipalities and/or counties would be required to implement the collection of SSOM, either through ordinances or licensing requirements of haulers within their jurisdiction.				
Funding Mechanisms	Service costs would be paid directly by residents to their hauler				
Barriers/Issues	• Only requires haulers to offer services, but not to provide to all customers • Does not require cities to mandate services, only an option • Minimizes education opportunities that city –wide uniform services offer				
Opportunities	• Can provide for multiple haulers opportunity to provide services • Expedites implementation				
Feasibility	Very feasible				
General Comments					
Centroid Information	**Twin Cities**	**Duluth**	**St. Cloud**	**Rochester**	**Total**
Cumulative GHG Reduction Potential					
Priority					
Centroid-Specific Comments					

3.5f	ANAEROBIC DIGESTION				
Description	Construct regional facilities in each centroid or a series of smaller facilities to process source separated organics (SSO) with the goal of capturing 80% of the remaining organics in the municipal solid waste (MSW) stream. Through capture of the gas, these facilities would produce energy to replace fossil fuels currently in use and send the digestate to be composted at local or regional composting facilities.				
Measurement Method	Reported tons of organics diverted to the digesters, reported volumes/quality of gas generated as an energy source, and reported tons of digestate sent to composting facilities. Periodic waste sorts at disposal facilities and incinerators would aid in measurement of the amounts of organics being diverted.				
Timeframe/Mileposts	• Approve/construct/operate first community-based digester under MPCA's research/demonstration project program – 2011 • Modify or create new rules in order to permit digesters designed to process the organics in MSW – 2015 • License/construct/operate first municipal/regional scale digester to process the organics in MSW – 2018				
Potential Implementation Parties	MPCA, MN Dept of Commerce (Office of Energy Security), regional/local governments (counties, SWMCB, WLSSD, economic development agencies), technology vendors, private sector investors/development companies, electrical utilities, other potential energy markets, etc.				
Costs	Medium/high capital cost compared to other organics processing methods.				
Funding Mechanisms	Solid waste fees/taxes on MSW disposal/processing facilities, state/federal grants, tipping fee at facility, energy revenues.				
Barriers/Issues	• Creating a sustainable infrastructure for the collection of source-separated organics. • Will require revising MPCA rules for permitting such facilities. • Public opposition to such facilities may be a problem.				
Opportunities	• Being considered a renewable energy source will help in reaching renewable energy portfolio standards. • Methane capture/recovery is higher than what can be achieved in landfill gas capture/recovery systems. • Potential for processing other organic waste streams (e.g. yard waste). • Digestate would still be able to go to a composting facility for further processing. • Replaces energy produced from fossil fuels while achieving GHG emissions reductions.				
Feasibility	Proven technology for processing medium to high-moisture organic waste streams.				
General Comments	Potential for MSW digestion though much more difficult from a technical and product quality (gas & digestate) perspective.				
Centroid Information	**Twin Cities**	**Duluth**	**St. Cloud**	**Rochester**	**Total**
Cumulative GHG Reduction Potential					
Priority					
Centroid-Specific Comments					

3.5g	BIOREACTOR LANDFILLS				
Description	Require that all new Minnesota MSW landfills, landfill expansions, or new cells constructed in existing landfills serving the 4 urban centroids incorporate leachate/liquid recirculation systems along with active gas recovery systems by 2017. Landfills in greater Minnesota would need to meet the same requirement by 2020.				
Measurement Method	Volume/quality of gas production, volume/quality of leachate, periodic measurements of settlement in terms of gained airspace.				
Timeframe/Mileposts	• Develop and codify rules for design and operation of bioreactor landfills – 2014 • Leachate/liquid recirculation systems in place in all landfills serving the 4 urban centroids – 2017 • Leachate/liquid recirculation systems in place in all landfills in greater Minnesota – 2020				
Potential Implementation Parties	MPCA, regional/local governments (counties, SWMCB, WLSSD), private and public landfill owners, electrical utilities, other potential energy markets, etc.				
Costs	Medium capital costs compared to other organics processing costs. Lower cost of gas recovery system is already in place.				
Funding Mechanisms	Tipping fees, energy revenues.				
Barriers/Issues	• Bioreactor landfill technology is still in the demonstration project phase (through the EPA's Office of Research and Development). Less than a dozen bioreactor landfills are in operation nationwide. • Will require developing new MPCA rules for permitting such facilities. • Public opposition to such facilities may be a problem. • Total gas capture from bioreactor landfills is uncertain. Methane that does escape capture has a GHG warming potential 25 times that of CO_2. • Other environmental issues associated with the design and operation of bioreactor landfills include significant increased gas generation, the physical instability of the waste mass due to increased moisture and density, instability of liner systems, and surface seeps due to waste mass movement and settlement. • Precludes any recovery of degraded organics as a potential feedstock for further processing into compost.				
Opportunities	• No change in current waste collection systems. • Decomposition and biological stabilization in significantly less time. • Could gain 15 to 30 percent in landfill space due to an increase in density of waste mass. • Significant increased LFG generation that, when captured, can be used for energy use onsite or sold. • Reduced leachate disposal costs and reduced post-closure costs.				
Feasibility	Technically feasible on a demonstration project basis.				
General Comments					
Centroid Information	**Twin Cities**	**Duluth**	**St. Cloud**	**Rochester**	**Total**
Cumulative GHG Reduction Potential					
Priority					
Centroid-Specific Comments					

3.5h	GASIFICATION				
Description	Construct regional facilities in each centroid to process source separated organics (SSO) with a goal of capturing 80% of the remaining organics in the municipal solid waste (MSW) stream. Through capture of the gas, these facilities would produce energy to replace fossil fuels currently in use.				
Measurement Method	Reported tons of organics diverted to the gasifiers and reported volumes/quality of gas generated as an energy source. Periodic waste sorts at disposal facilities and incinerators would aid in measurement of the amounts of organics being diverted.				
Timeframe/Mileposts	Modify or create new rules in order to permit gasifiers designed to process SSO – 2014 License/construct/operate first municipal/regional scale gasifiers to process SSO – 2018				
Potential Implementation Parties	MPCA, MN Dept. of Commerce (Energy Security Office), regional/local governments (counties, SWMCB, WLSSD, economic development agencies, etc.), technology vendors, private sector investors/development companies, electrical utilities, other potential energy markets, etc.				
Costs	High capital cost compared to other organics processing methods.				
Funding Mechanisms	Solid waste fees/taxes on MSW disposal/processing facilities, state/federal grants, tipping fee at facility, energy revenues.				
Barriers/Issues	• Little experience in the U.S. with gasifying SSO. • Technology may be better suited to processing waste streams with a lower moisture content than SSO. • Creating a sustainable infrastructure for the collection of source-separated organics. • Will require revising MPCA rules for permitting such facilities. • Public opposition to such facilities may be a problem.				
Opportunities	• Being considered a renewable energy source will help in reaching renewable energy portfolio standards. • Potential for processing other materials (e.g. MSW) and may be economically competitive with RDF production or mass burn incineration. • Efficient process for energy production. • Replaces energy produced from fossil fuels while achieving GHG emissions reductions. • Char may have some value as a soil amendment.				
Feasibility	Technically feasible though little operational experience with SSO in the U.S.				
General Comments					
Centroid Information	**Twin Cities**	**Duluth**	**St. Cloud**	**Rochester**	**Total**
Cumulative GHG Reduction Potential					
Priority					
Centroid-Specific Comments					

3.6 MARKET SECTOR (ORIGIN AND END MARKETS)

3.6a	Increase Markets for Compost				
Description	Composters currently report that they have adequate markets for their high quality compost. They report that the lower quality compost, compost containing film plastics from plastic bags, does not have markets. This highlights the need to produce high quality compost. The goal of 10% organics recovery by 2012 and 15% by 2020 will require close attention be paid to producing high quality compost and growing end markets to accommodate the increased in available compost.				
Measurement Method	SCORE report collects data on organics collected for food-to-people, food-to-animals/feed, and composting. Refining that data collection method would provide the needed diversion numbers to determine if the 10 and 15 percent goal has been reached.				
Timeframe/Mileposts					
Potential Implementation Parties	Private sector, public sector and non-governmental entities				
Costs					
Funding Mechanisms					
Barriers/Issues	Visual contamination, quality of finished compost, research needed to encourage new markets in storm water management BMP's.				
Opportunities	Storm water management BMP that increase the infiltration of storm water improving water quality of surface water bodies. Organic farmers have not been tied into the use of compost from either yard waste facilities or yard waste/food waste compost facilities. This is a significant opportunity, considering the growth in the organic industry and value of compost as fertilizer replacement.				
Feasibility					
General Comments	Education is key to the success of organics collection programs.				
Centroid Information	**Twin Cities**	**Duluth**	**St. Cloud**	**Rochester**	**Total**
Cumulative GHG Reduction Potential					
Priority					
Centroid-Specific Comments	The Metro Centroid has been very active in promoting organics reuse/recycling/composting.	Duluth has a mandatory recycling ordinance for commercial generators of organic materials and provides the compost facility.	St. Cloud has been relatively in-active and has not shown much interest.	Rochester has been relatively in-active and has not shown much interest.	

3.7 RESEARCH

3.7a	Environmental Impact and Cost Analysis of Various Organic Management Methods				
Description	Costs and Environmental Impact Analysis: Landfill with Gas Recovery, Bioreactor Landfill with Gas Recovery, Separate Cell with Leachate Collection (Cuyahoga, OH), Greenwaste as ADC (California), Large and Small Windrow Composting Systems, Anaerobic Digestion				
Measurement Method	Gather broad spectrum (VOC's, GHG) emissions data from all types of facilities/sites and compare the data/information, including fuel used and emissions generated, leachate and run-off, total environmental impact of all types of systems versus in small (backyard) and large windrow compost systems and in anaerobic digestion systems. Compare costs of all methods and emissions generated, total lifecycle C footprint.				
Timeframe/Mileposts	Three year study?				
Potential Implementation Parties	Facility owners and operators, state and local government				
Costs	Most Systems already in place. Costs for emissions testing, and Life Cycle C Footprinting, including all transport of all materials and related emissions, fuel and emissions associated with application of finished compost				
Funding Mechanisms	State funding				
Barriers/Issues	No state funding available				
Opportunities	Assurance that we are proceeding with a firm foundation of data				
Feasibility	Very feasible				
General Comments	We need this information to make a scientific, fact based decision about what method of organics management is right for Minnesota from an environmental and cost/benefit standpoint.				
Centroid Information	**Twin Cities**	**Duluth**	**St. Cloud**	**Rochester**	**Total**
Cumulative GHG Reduction Potential					
Priority					
Centroid-Specific Comments					

3.7b	Compost Lifecycle Analysis Research Limitations
Description	The MPCA completed a literature review in December, 2008. The MPCA had limited funds available for the literature review, so several LAC were preliminarily reviewed and the two most complete studies were chosen for detailed review. Overall the literature review revealed that compost is a net benefit in reducing GHG. However, the review also revealed that each of the LAC's could not be compared, as each evaluated different components of the system. For example, some LAC's consider collection a standard part of any system (recycling trash, yard waste, ssom, etc.); therefore transportation is evaluated as a stand-alone system, and the compost LAC begins with the materials entering the composting facility. Other studies include transportation in the LAC evaluation. The two LAC reviewed did not include transportation, so in that way they were comparable to each other. Another common shortfall of compost LAC's is that rarely do they include the carbon offset benefits of the end use of compost (including the GHG generated in transportation of the material to the end use). As a result, most evaluations show that composting is either a neutral impact on GHG generation or a slight benefit. Each study says that, so long as compost is not transported great distances, it will have a significant net benefit to reducing the impact of GHGs. Nevertheless, most studies compare composting to landfilling, and not to other forms of extracting energy from the feedstock waste. So, while diversion from a landfill appears to be a desirable practice, it is less clear how waste should be managed post-diversion. In addition, most studies assume both well-managed composting operations and beneficial application of the resulting compost (and, therefore, offsets of synthetic chemicals and fossil fuels). This combination of avoided landfilling and chemical offsets determines the scope of the benefits from composting as related to GHGs. Furthermore, some studies do assume that the compost is applied in significant quantities per acre in a commercial agricultural setting, and often to soils different than, or more degraded than, most of those in Minnesota. Moreover, the scope of the benefits of compost application in gardens in metropolitan areas (where most compost feedstocks are likely to originate, and where most compost is likely to be applied) is less well studied and/or publicized, and, so, is less clear.
Measurement Method	The limitations of the above studies, and other LAC not included in the literature review, are that there is not enough hard data to be used in models to get a more complete picture of the LAC of compost. All recommend further research is needed to refine the existing LAC analysis.
Timeframe/Mileposts	
Implementation Parties	State of Minnesota, University of MN, US Composting Council Foundation
Costs	Unknown
Funding Mechanisms	Public and Private Funding
Barriers/Issues	Funding is needed Research take many years to be completed
Opportunities	• National Survey of compost facilities to facilitate data collection on GHG emissions resulting from processing YW and Food scraps

	• Conduct a series of LCA studies using a consistent study protocol such as the ISO process described in the Australian LAC in different climates, on different soil types, with different crop types to fill the gaps in data and research on the benefits and risks of compost use and its effect on GHG generation and mitigation • Research the impacts of aerobic composting on GHG generation and mitigation including carbon sequestration.
Feasibility	
General Comments	

Centroid Information	Twin Cities	Duluth	St. Cloud	Rochester	Total
Cumulative GHG Reduction Potential					
Priority					
Centroid-Specific Comments					

3.7c	WARM modeling limitations
Description	Currently the USEPA's WARM is the most accessible public model for use for evaluating GHG impacts. That model was set up primarily for modeling GHG impacts for recycling, not the reuse or recycling of organic materials. Examples would be the model is insufficient for evaluating food to people and food to animal/animal feed options. It is also insufficient for modeling compost, as it is missing the benefits accrued in the end use of compost and the negative impacts of transporting the materials to the end use.
Measurement Method	To deal with the more complicated system of managing organic materials the following actions could be pursued: 1. Revise the WARM model, or 2. A separate model created
Timeframe/Mileposts	The sooner the better.
Potential Implementation Parties	Financial resources will be needed to conduct the research needed to develop the data needed to refine the LAC on compost.
Costs	Unknown
Funding Mechanisms	Public and private funding
Barriers/Issues	• Financial and personnel resources are needed to complete the update of the WARM model • WARM does not yet allow a user to reflect the shifting of food and food scraps any further up the hierarchy than composting. That is, it does not have a separate entry for food scraps that are converted to animal feed (which could be considered recycling) or edible food that is saved for human consumption (a form of source reduction). It is likely, for example, that food-to-people would show an excellent return-per-ton on GHG avoided if fertilizer use were confirmed to be avoided; the offset fertilizer would add to benefits that come from keeping food waste out of landfills at, or below, the EPA default of 75% landfill-gas capture efficiency. • The lack of an accurate model to calculate the GHG impacts/benefits of food to people, food to animals/animal feed and compost . • The model allows for food scraps, yard trimmings, grass, leaves, branches, and mixed organics (48% food scraps/52%

	yard trimmings). However it does not allow for the composting of non recyclable paper (paper plates, paper napkins…). That material can only go to a resource recovery facility or be landfilled. • Another missing piece for composting is the ability to adjust percentages of feed stocks. The mixed organics category use a calculation of 48% food scraps/52% yard trimmings, yet Minnesota demonstration facilities are allowed to compost only a 20% food scraps/80% yard trimmings. Any percentage greater than 20% food scraps would need to go to a compost facility that has a solid waste composting permit. • The benefits of end use of compost are not included in the model. Neither is the negative impact of transporting the material to the end use included. • More research is needed to accurately calculate the GHG impacts of composing.				
Opportunities	Partner with the USEPA to update the model				
Feasibility	It is feasible to develop this model. Expertise, funding and time is needed.				
General Comments	There has been some discussion within the USEPA of revising the model. Unknown what those discussion generated.				
Centroid Information	**Twin Cities**	**Duluth**	**St. Cloud**	**Rochester**	**Total**
Cumulative GHG Reduction Potential					
Priority					
Centroid-Specific Comments					

3.8 CD&I

3.9 OTHER