

# MINNESOTA>ENVIRONMENTAL<INITIATIVE

## Appendix K: Landfill Disposal Sub-Group Straw Proposals

### 5.1 POLICY/LEGISLATION

| 5.1a                               |   | Methane Capture Rates |           |           |       |
|------------------------------------|---|-----------------------|-----------|-----------|-------|
| Description                        | Mandate that all landfills in the state of Minnesota must meet the requirement that a continuous, minimum 90% capture and destruction rate of all methane generated through-out the life span of each landfill, including all active and post-closure emissions. Determination of this capture rate though continuous monitoring with best available technology would be required.  |                       |           |           |       |
| Measurement Method                 | Cannot continuously monitor, need to do via computer modeling.  |                       |           |           |       |
| Timeframe/Mileposts                |   |                       |           |           |       |
| Potential Implementation Parties   |   |                       |           |           |       |
| Costs                              |   |                       |           |           |       |
| Funding Mechanisms                 |   |                       |           |           |       |
| Barriers/Issues                    | <p>Any state or federal requirements on LFG control in an effort to reduce GHG emissions would remove the additionality (or voluntary) aspect to these projects, and the smaller landfills wouldn't be eligible to sell carbon offsets. These projects are expensive for the smaller landfill with limited revenue from gate receipts. Redirect the focus to economic incentives versus mandates. According to the MPCA projected 2011 methane emissions from the 21 landfills:</p> <ul style="list-style-type: none"> <li>* 69.2% of the waste being landfilled are to landfills required to have active LFG control by NSPS (total of 4 landfills)</li> <li>* With Clay County, Crow Wing, East Central, and part of Ponderosa having active LFG control voluntarily, the total is about 75% of the waste being landfilled.</li> <li>* These 4 sites could gain \$263,000 to \$1,040,000 on the current carbon market.</li> <li>* Adding the next 7 largest sites voluntarily (15 of the 21 landfills) gets to 90% of the waste being landfilled.</li> <li>* These 7 sites could gain \$420,000 to \$1,660,000 on the carbon market.</li> </ul> <p>Technically it is doubtful that you can continuously monitor methane generation at a landfill. Would have to use computer modeling. Difficult to measure gas output at early and late stages of landfill development due to very low gas production.</p> |                       |           |           |       |
| Opportunities                      |   |                       |           |           |       |
| Feasibility                        |   |                       |           |           |       |
| General Comments                   |   |                       |           |           |       |
| Centroid Information               | Twin Cities   | Duluth                | St. Cloud | Rochester | Total |
| Cumulative GHG Reduction Potential |   |                       |           |           |       |

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| Priority                   |  |  |  |  |  |
| Centroid-Specific Comments |  |  |  |  |  |

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## 5.4 REGULATION & PERMITTING

| 5.4a                               | Expansion of Landfill Post-Closure Assurances and Insurance Requirements   |        |           |           |       |
|------------------------------------|--|--------|-----------|-----------|-------|
| Description                        | <p><b>Recommendations.</b> MPCA must complete analysis of financial assurances to create a mechanism to address the State’s Landfill Post Closure largest risk factors, remedial corrective action and third party injuries that are most likely to arise after care and current assurance mechanisms end. To do that, the instrument must address each of these criteria:</p> <ol style="list-style-type: none"> <li>1 Extend past the legal period of post-closure care.</li> <li>2 Offer coverage that both reflects probabilistic events and can, as a practical matter, cover at least a significant part of the true risks. The MPCA could commission insurance experts to develop fully and then apply an “Extended Environmental Impairment Landfill Insurance” policy.</li> <li>3 Retain the full value of the assurance funds in the mechanism until the end of the post-closure period because there is a significant probability that unanticipated maintenance expenses will arise.</li> <li>4 Require that, if a surety bond and letter of credit is cancelled, the State shall be assumed to have exercised its right to claim the funds under the mechanism on the 120<sup>th</sup> day following notice of cancellation unless the State affirmative acts to forego its right to do so prior to that time.</li> </ol> |        |           |           |       |
| Measurement Method                 |  |        |           |           |       |
| Timeframe/Mileposts                |  |        |           |           |       |
| Potential Implementation Parties   |  |        |           |           |       |
| Costs                              |  |        |           |           |       |
| Funding Mechanisms                 |  |        |           |           |       |
| Barriers/Issues                    |  |        |           |           |       |
| Opportunities                      |  |        |           |           |       |
| Feasibility                        |  |        |           |           |       |
| General Comments                   | <p><b>MPCA is currently drafting required rules in a formal rule revision addressing financial assurance requirements for disposal facilities. This strategy will be addressed in that process.</b></p> <p><b>GHG benefit is not clear from this strategy. Also most GHG is occurs during the active life and in the beginning years of post-closure.</b></p>  |        |           |           |       |
| Centroid Information               | Twin Cities  | Duluth | St. Cloud | Rochester | Total |
| Cumulative GHG Reduction Potential |  |        |           |           |       |
| Priority                           |  |        |           |           |       |
| Centroid-Specific Comments         |  |        |           |           |       |

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|------------------------------------|--|---------------|------------------|------------------|--------------|
| <b>5.4b</b>                        | <b>Promote Leachate Recirculation and Bioreactor Landfills</b>   |               |                  |                  |              |
| Description                        | Promote leachate recirculation and bioreactor landfills  |               |                  |                  |              |
| Measurement Method                 | Number of landfill that utilize this technology  |               |                  |                  |              |
| Timeframe/Mileposts                | 1-year to finalize leachate recirculation, 2 –3 years for bioreactor.  |               |                  |                  |              |
| Potential Implementation Parties   | Existing 21 landfills landfill operators and MPCA.   |               |                  |                  |              |
| Costs                              |  |               |                  |                  |              |
| Funding Mechanisms                 | If made to be economical, landfills will accomplish and will be funded by themselves.  |               |                  |                  |              |
| Barriers/Issues                    | Need to finalize and implement rules to allow this technology. MPCA working on a guidance document that will allow more landfills to recirculate leachate. Leachate recirculation will just require state action, Bioreactors still require federal interaction.   |               |                  |                  |              |
| Opportunities                      | <p>LFG emitted by landfills that utilize this technology will be generated quicker in the process and over a shorter timeframe. This has the following benefits:</p> <ul style="list-style-type: none"> <li>- Makes energy recovery more attractive.</li> <li>- Faster timeframe for decomposition and biological waste stabilization; reduces long environmental risks and post-closure costs.</li> </ul>   |               |                  |                  |              |
| Feasibility                        | Technology already exist, just need a favorable regulatory environment to promote this technology.   |               |                  |                  |              |
| General Comments                   | <p>In 2006, the Solid Waste Association of North America (SWANA) and the US Composting Council agreed there is a place for both composting and bioreactor landfills. The agreement outlines that both serve beneficial but different roles and different functions in integrated waste management.</p> <p>There is a very strong possibility we will not see any new siting for any type of waste management facility within Minnesota due to the NIMBY syndrome. Therefore, the choice to extend the service life of the existing landfills is critical. By implementing this technique to extend a landfill life it gives science and technology time to develop methods and systems to deal with the challenges of solid waste in a more environmental benign and cost-effective manner.</p> <p>Some states allow YW to be landfilled if they have gas recovery systems (California, Nebraska). Minnesota allows YW to be composted on top of landfills. Some states are initiating legislation to allow YW into landfills with gas recovery (Michigan, Oklahoma, Florida).</p> |               |                  |                  |              |
| <b>Centroid Information</b>        | <b>Twin Cities</b>   | <b>Duluth</b> | <b>St. Cloud</b> | <b>Rochester</b> | <b>Total</b> |
| Cumulative GHG Reduction Potential |  |               |                  |                  |              |
| Priority                           |  |               |                  |                  |              |
| Centroid-Specific Comments         |  |               |                  |                  |              |

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### 5.7 RESEARCH

| 5.7a                               | Cost Benefit Study of Installing Flare and Landfill Gas to Energy Systems  |        |           |           |       |
|------------------------------------|--|--------|-----------|-----------|-------|
| Description                        | Review nearly completed MPCA closed landfill study to determine feasibility of implementing flares, gas recovery systems. Within the context of feasibility of closed landfill study, examine all open landfills without landfill gas to energy systems for the cost/benefit of installing either flare systems or landfill gas to energy systems. An abbreviated study would focus on landfills in/proximal to Centroids. |        |           |           |       |
| Measurement Method                 | Identify and categorize the universe of both open and closed landfills. Categorize based on age of facility, size/tonnage. Determine representative sample of each category and conduct testing to determine current, uncontrolled emissions, gas recovery potential, need for flare system or landfill GTE system, potential partnerships with utilities, renewable energy opportunity and return on investment.          |        |           |           |       |
| Timeframe/Mileposts                | 2 years; See also General Comments below.  |        |           |           |       |
| Potential Implementation Parties   | MPCA, public and private landfill owners, prospective utilities/third party gas operators.   |        |           |           |       |
| Costs                              | Depends on depth of study  |        |           |           |       |
| Funding Mechanisms                 | SW tax; Minn Stat. 216c.41 renewable energy tax credits extended to Landfill gas as renewable energy.  |        |           |           |       |
| Barriers/Issues                    | Lack of funding, low gas production at closed facilities may not warrant doing anything. Increased costs for publicly owned facilities if required to install flares. Perception of increased regulation with the study itself.  |        |           |           |       |
| Opportunities                      | Reduction in GHG emissions, determination of cost, business opportunity for third party gas plant operation, renewable energy opportunity for utility.   |        |           |           |       |
| Feasibility                        | Depends on depth of study  |        |           |           |       |
| General Comments                   | MPCA has considered this proposal in the past for closed landfills in the Closed LF Cleanup Program. Some of this information may already be available, which would reduce the time required for the study.  |        |           |           |       |
| Centroid Information               | Twin Cities  | Duluth | St. Cloud | Rochester | Total |
| Cumulative GHG Reduction Potential |  |        |           |           |       |
| Priority                           |  |        |           |           |       |
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| 5.7b                             | Identify and Remove Barriers to Landfill Gas to Energy  |               |                  |                  |              |
|----------------------------------|---|---------------|------------------|------------------|--------------|
| Description                      | Identify and remove barriers to LFGTE (Landfill Gas to Energy)  |               |                  |                  |              |
| Measurement Method               | Increase in LFGTE projects and/or increase in amount of methane destroyed in LFGTE projects.  |               |                  |                  |              |
| Timeframe/Mileposts              | 1 year to identify issues, 2 –3 years to modify/change statutes or other documents  |               |                  |                  |              |
| Potential Implementation Parties | MPCA and landfill operators & their consultants. At a later date, bring in power companies representatives and potential business that can utilize LFG as direct sell.  |               |                  |                  |              |
| Costs                            | Internal costs for majority. If an incentive payment were added there would be an additional cost.  |               |                  |                  |              |
| Funding Mechanisms               | Incentive payment would be funded with same funds existing incentive payments.  |               |                  |                  |              |
| Barriers/Issues                  | Willingness to accomplish in depth reviews and modify existing rules. Need to be able to weight what has greater environmental gain – GHG versus other environmental issues.  |               |                  |                  |              |
| Opportunities                    | All existing 21 landfill.   |               |                  |                  |              |
| Feasibility                      |   |               |                  |                  |              |
| General Comments                 | <p>Some of the existing issues:</p> <ul style="list-style-type: none"> <li>- For electric generation                             <ol style="list-style-type: none"> <li>1. Add a landfill gas incentive payment to Minn. Stat. 216C.41</li> <li>2. Local utilities are unwilling to set precedent by funding any interconnect capital</li> <li>3. Local electrical infrastructure too small or too far away for electric generation</li> <li>4. Utility wants to maintain carbon credit, removing potential revenue stream from Landfill</li> <li>5. Utility not willing to pay the cost per kw-hr to breakeven</li> <li>6. (need to talk to WM to see what their issues they encountered when they installed their electric generator plants, i.e., EAW requirements, air permits, etc.)</li> </ol> </li> <li>- Direct sell                             <ol style="list-style-type: none"> <li>1. Consider incentive payment for direct use too.</li> <li>2. No direct gas use option nearby. Option preference is 24/7 using as much gas as collected – promote an “energy park” concept.</li> <li>3. Viability of direct option required economic stability of user.</li> <li>4. Easement issues for pipelines going off site. (note back in 2006, Pennsylvania took steps to makes the development of landfill gas projects easier. The state is making highway right-of-ways available for landfill gas pipelines, a move that encourage and promote such projects.)</li> </ol> </li> <li>- General issues                             <ol style="list-style-type: none"> <li>1. As landfills get smaller, LFG (landfill gas) generation is lower and capital and O&amp;M cost per kw-hr is higher (loss of economy of scale and less bang for the buck).</li> <li>2. Smaller projects may need a grant or other funding that doesn’t require debt or payback</li> <li>3. Air permitting issues</li> </ol> </li> </ul> |               |                  |                  |              |
|                                  | <b>Twin Cities</b>  | <b>Duluth</b> | <b>St. Cloud</b> | <b>Rochester</b> | <b>Total</b> |

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| Priority                           |  |  |  |  |  |
| Centroid-Specific Comments         |  |  |  |  |  |