Technical Document on Municipal Solid Waste Organics Processing in Canada

Document technique sur le traitement des résidus municipaux solides

Alain David, Environment Canada

& Scott Gamble, CH2M Hill

Faites un cadeau à la terre ... compostez !
Give Back to the Earth ... Compost!

22e Conférence nationale annuelle sur le compost
Du 19 au 21 septembre, 2012

22nd Annual National Compost Conference
September 19-21, 2012

Conseil canadien du COMPOST Council of Canada

ALLIANCE DE LA QUALITÉ COMPOST QUALITY ALLIANCE

RECYC-QUÉBEC Québec

COMPOSTABLE www.compostable.info

www.compost.org

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Technical Document on Municipal Solid Waste Organics Processing

Composting Council of Canada
Annual Conference
Montréal
September 21, 2012

Alain David, Environment Canada
Scott Gamble, CH2M Hill

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- Phase I – 2010/11: Foundation
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- Phase III – 2012/13: Translation and Outreach
- “Infomercial”
- Overview of the Technical Document on MSW Organics Processing (Scott Gamble)
- Questions

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Background

- Annual greenhouse gas emissions from landfills (Mt eCO2):
  - Estimated generation from landfills: 24.9
  - Emissions from landfills: 17.6
  - GHG reductions from landfills: 7.3
  - National recovery rate: 30%
- 68 landfill gas collection systems (32 with utilization)
- Landfills represent about 20% of national methane emissions
- Two-pronged approach:
  - Increase LFG recovery (short term)
  - Divert organics from landfills (longer term)

Background (cont.)

- 2006 - MSW Options: Integrating Organics Management and Residual Treament/Disposal
  - Composting
  - Anaerobic digestion
  - Thermal treatment
  - Bioreactor and sanitary landfill

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Goal and Objective

- Overall goal: Reduce GHG emissions from landfills by reducing the quantities of organics going to landfills
- Other benefits:
  - Reduce leachate formation
  - Produce a high quality compost
  - Generate renewable energy (anaerobic digestion)
- Objective of this project: To build practical/technical knowledge on organics diversion processing for more informed decision making and policy development.

Phase 1 - Foundation

- 2011 internal report: Foundation for a technical Document on MSW Organics Processing
  - Phone interviews: 13
  - Face-to-face meetings: 6
  - Site visits: 3
  - Email correspondence: 3
- Provincial and territorial government representatives
- Municipal government representatives
- Private sector organics facility developers and processors
- Private sector consultants
- Composting Council of Canada

Phase 1 - Foundation (cont.)

Key comments

- Supportive of the concept, would be helpful for policy development and useful reference
- Impartial documentation is needed for more informed decision making
- Similar technical challenges faced across Canada
- Technology not working as planned (over-statement by vendors)
- Food waste creating a new set of challenges
- Need more processing capacity
- Best practices are not well defined
- Needs a team approach to develop such a document

Phase II - Development of the Technical Document on MSW Organics Processing

- Approved funding: $150K over 2 fiscal years
- Request for proposals on MERX (closed Sept 30, 2011)
- 11 strong proposals/teams
- Selection process
- Contract signed with CH2M Hill team November 2011 over two fiscal years (contract to end October 31, 2012)
  - 8 technical experts, 3 editors, 5 senior reviewers, 2 support staff
- Scott Gamble (project manager with CH2M Hill) will give an overview of the document

Phase III - Translation and Outreach

- Translate into French (Fall/Winter 2012)
- Post on EC website (Spring 2013)
- Advertise
- Present at various venues

Infomercial – Global Methane Initiative

METHANE EXPO 2013

GLOBAL METHANE INITIATIVE EXPO

Vancouver, Canada
12 - 15 March 2013

12 - 15 March 2013

Global Methane Initiative

The World's Largest Forum for Methane Projects, Technology, Financing and Policy

Methane Expo 2013, organized by the Global Methane Initiative, is the premier international forum for promoting methane recovery and use project opportunities and technologies. Previous Expos were held in Beijing, China and New Delhi, India and included:

- Over 750 participants from 34 countries
- 91 featured methane capture and use project opportunities
- More than 100 exhibitors

Methane Expo 2013 Provides Participants with Opportunities to:

- Showcase methane mitigation projects and technologies
- Learn about the latest project opportunities, technologies, and services
- Meet with potential project partners and financiers
- Explore key technical, financial, and policy issues
- Interact with high-level government agencies from 41 countries

Methane Expo 2013 is organized in partnership with:

Canada

The Global Methane Initiative (GMI) is a voluntary, multilateral partnership that aims to reduce global methane emissions and to advance the abatement, recovery and use of methane as a valuable clean energy source. GMI achieves this by creating an international network of partner governments, private sector members, development banks, universities, and NGOs in order to build capacity, develop strategies and markets, and remove barriers to project development for methane reduction in partner countries.

The initiative is comprised of 41 Partner governments and more than 1,100 public and private sector organizations engaged in methane recovery and use projects and activities worldwide.

For more information please visit: www.globalmethane.org/expo

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Technical Document on Municipal Solid Waste Organics Processing

- Intent: To provide up-to-date factual reliable technical information for decision-makers to choose and implement the most appropriate MSW organic waste treatment option meeting their needs.
- Bring together the knowledge and the expertise in an easy-to-understand format

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Technical Document Contents

- Document contains 18 chapters on various aspects of organic waste management.
- Each section written by practitioner in that field, and reviewed by other members of the team as well as by 3rd party technical experts .
- References and promotes best practices related to technology and design, but has limited information on operational best management practices.
- Key chapters:
  - Science of composting and anaerobic digestion
  - Processing Technologies
  - Biogas Conversion and Utilization Options
  - Facility Siting and Design Considerations
  - Facility Procurement Approaches
  - Odour and Nuisance Control and Management
  - Compost Quality Standards/Compost Markets
  - Overall System Development and Selection

Composting and AD Technologies

- Chapters provide a technical overview of both composting and anaerobic digestion systems.
- Including a discussion of advantages and disadvantages, and pre-processing requirements.
- Vendor-neutral discussion.

TABLE 5-1: TYPES OF COMPOSTING SYSTEMS

Passively Aerated and Turned Composting Systems	Actively Aerated Composting Systems

• Static pile
• Windrow
• Turned mass-bed
• Bunker
• Passively Aerated Windrows
	• Aerated static pile
	  ▪ uncovered
	  ▪ covered
	• Fully enclosed Tunnels
	• Channel systems
	• Containerized systems
	  ▪ Static
	  ▪ Agitated
	• Agitated Bed systems

TABLE 6-1: DIGESTER TYPES

	Digester Water Content	Feedstock Type
High solids – stackable	Less than 60%	Stackable materials
High solids – slurry	Between 60% and 80%	Wet but not liquid
Wet	Greater than 80%	Liquid

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Odour and Nuisance Control

- Discussion of odour sources, sampling and quantification methods.
- Review of commonly used and proven treatment technologies, their advantages and limitations.

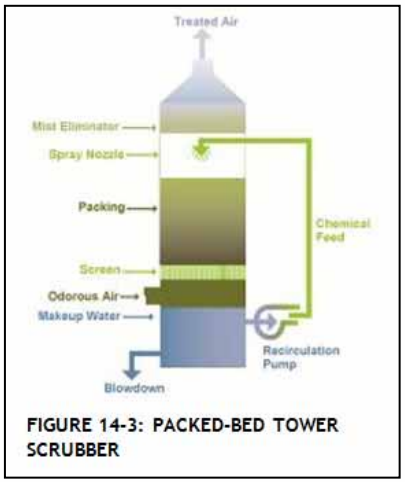
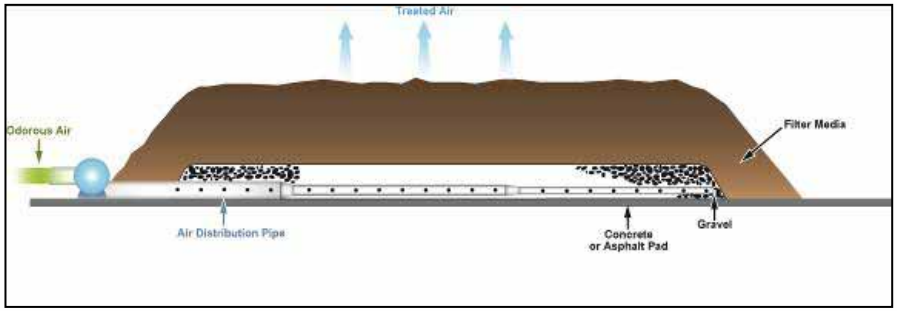


FIGURE 14-3: PACKED-BED TOWER SCRUBBER



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Product Standards and Markets

- Provides a summary of current product quality standards for compost (including consolidated reference tables).
- Discussion of various uses for finished compost products and biogas including end user requirements.
- Presents information on biogas uses and the cleanup steps and technologies required.

TABLE 16-1 : SUMMARY OF STANDARDS

	Fertilizer Act	Guideline for Compost Quality	Organic Soil Conditioners – Composts
Maximum Trace Element Concentrations	✓	✓	✓
Maturity	✓	✓	✓
Pathogens	✓	✓	✓
Foreign Matter (including Sharps)	✓	✓	✓
Moisture Content and Organic Matter	✓		✓
Labelling	✓		

Typical Biogas Parameters

- CH_4: 60% by volume
- CO_2: 40% by volume
- H_2S: 200 to 4000 ppm
- Siloxanes chlorinated organics, and VOCs: highly variable

Compost Uses for Reclamation:

1. Manufactured topsoil component
2. Soil additive (upgrading marginal soils)
3. Bioremediation of contaminated soils (e.g., heavy metals, petroleum-based contaminants)
4. Remediation of organically dead soil
5. Landscape plants and turf establishment
6. Agricultural/energy crop establishment

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System Development and Selection

- Discussion on how various programs and facilities can be combined to form an integrated system.
- Six commonly used systems are presented and discussed.
- Example of method that can be used to evaluate and compare system options.

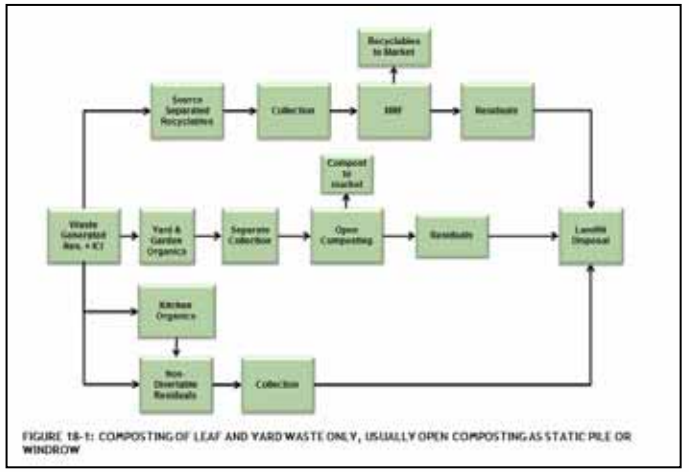

FIGURE 18-1: COMPOSTING OF LEAF AND YARD WASTE ONLY, USUALLY OPEN COMPOSTING AS STATIC PILE OR WINDROW

Category	Potential Impact – Combination 4 AD of the food waste in a dedicated facility and open windrow composting of the leaf and yard waste. Separate composting may be used for digestate management (if required)
Waste Diversion Potential	This combination of systems could handle virtually all of the organic waste stream with a high waste diversion rate
Easy of Collection	Separate source segregation and collection of leaf and yard waste, and food waste requires extra effort and truck trips for collection. Separate containers are also required at the household and ICI levels.
Compost Quality	Source segregated collection of organics will result in high quality products. Composting of digestate is required for most AD technologies. Suitable for what?
Ease of Selling Compost and energy	Compost from leaf and yard operations should continue to see good markets. Digestate, generally is also of high quality (after treatment as required), although volumes are lower due to energy extraction.
Energy Benefits	Good energy recovery through biogas generation from AD, which should displace energy used for composting and provide additional energy to help displace use of fossil fuels.
GHG Reductions	High GHG benefits due to the generation of renewable energy which can displace fossil fuel based energy.
Relative Costs	The capital and operating costs of AD systems are generally very high, depending on the economies of scale, and the revenue from the sale of energy often requires a very long period to help repay the capital costs, plus the technology must work very efficiently and meet gas production targets.

Questions?