May 31, 2013

Household Organic Waste Composting in Metro Vancouver

Greenhouse Gas Emission Reductions and Green Community Carbon Credits for Carbon Neutral Reporting

2012 Reporting Year

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This report was prepared by the staff of the Air Quality Policy and Management Division of Metro Vancouver.

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EXECUTIVE SUMMARY

This document provides an overview of the greenhouse gas (GHG) emission reduction calculations for the increased diversion of organic material from the solid waste stream between 2007 and 2012, attributable to organics collection programs run by municipalities in the Metro Vancouver region. All municipalities (except for the City of Burnaby) in the region are signatories to the B.C. Climate Action Charter, and as such have made a voluntary commitment to make progress towards carbon neutrality. To balance their carbon inventories, they require GHG reduction credits each year from projects such as this one, which they will use as non-market "offsets".

Metro Vancouver's Role: The final disposal of municipal solid waste from all municipalities in the region is managed at Metro Vancouver disposal facilities and the Vancouver Landfill located in the Corporation of Delta. Metro Vancouver's Solid Waste Services Department maintains records of the solid waste flows throughout the waste management system, up to and including final disposal at two landfills and a waste-to-energy facility. This means that the organization is uniquely positioned to conduct the emission reduction calculations associated with organics diversion. This report has been prepared on behalf of the region's municipalities to fulfill the reporting requirements associated with the Climate Action Charter and the Provincial Carbon Neutral Local Government Program.

Project Overview: This emissions reductions project comprises the collection of municipal organics (yard waste and/or food scraps) through residential "green bin" programs, thereby avoiding methane emissions that would have occurred had the organics undergone anaerobic decomposition in a landfill. Municipalities provide residents with green bins for their household organic material. Municipal fleet vehicles (either owned or contracted) then collect the organics in parallel with the regular household waste and recycling collection programs. The collected organics are brought to a composting facility, where controlled aerobic composting processes ensure that GHG emissions are minimized. Co-benefits of organics diversion include the production of useful compost, and reducing volume of waste landfilled.

Baseline and Additionality: The baseline year for this project is 2006. Therefore, a municipality can only receive carbon credits for additional tonnes of organics that are collected in a subsequent year, beyond the amount collected in the baseline year. Although some municipalities have been diverting and composting organic material since before the Climate Action Charter was signed, there have been significant increases in organics collected as existing programs are expanded and some new programs are initiated. There is currently no regulatory requirement for municipalities to collect and compost organics.

Methodology and Estimated Emissions Reductions: The project uses the methodology outlined in the Option 1 Project Profile on Household Organics Waste Composting provided by the Green Communities Committee, in conjunction with the accompanying calculator. Metro Vancouver has prepared this report in accordance with the Green Communities Committee's Becoming Carbon Neutral Guidebook. The estimated emissions reductions credits for 2012 are based on all additional organics diversion subsequent to the signing of the Charter, i.e. the last quarter of 2007, and 2008-2012 inclusive. Total Green Communities GHG reduction credits ("carbon credits") for all eligible municipalities have been calculated to be almost 65,000 tonnes CO2-equivalent, which can be used for the 2012 reporting year. A smaller number of credits are expected for future years.

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1.0 COMPLIANCE WITH GREEN COMMUNITIES CARBON NEUTRAL FRAMEWORK OPTION 1 PROFILE

1.1 Household Organics Waste Composting – Option 1 Profile Summary

Municipal curbside organics collection programs have been successful in diverting increasing quantities of organic waste (yard trimmings and food scraps) from landfills. Organics diversion activities have environmental benefits, including avoided emissions of landfill gas (which contains methane, a potent greenhouse gas). The Provincial Green Communities Committee (GCC) has developed a profile and calculator to allow municipalities to calculate GHG reductions attributable to organics diversion. The resulting carbon credits can be used towards Municipal Carbon Neutrality goals, under the Climate Action Charter framework.

The project profile on Household Organics Waste Composting (the Profile) provides guidance on estimating the amount of greenhouse gas (GHG) emissions that can be reduced by diverting household organic waste into a centralized community composting system rather than sending it to a landfill. When organic waste is placed in a landfill, methane emissions occur gradually over 100+ years as the material decays (Baseline Emissions). In contrast, placing the same amount of organic waste in a centralized composting facility involves a rapid aerobic decay that generates far fewer emissions within a single year (Project Emissions). So when organic material is composted instead of going to a landfill, there is a reduction of emissions that would have occurred at the landfill in the future. The project profile and accompanying organics diversion calculator (the Calculator) provides an accounting approach to measuring these reductions over time in each year that they would have occurred. GHG reduction credits are allocated to the year in which the organics diversion occurred.

1.2 Baseline Year and Project dates

The baseline year is 2006 and any organics diversion that occurred post signing of the Climate Action Charter (September 2007) is eligible for credits. For the 2012 reporting year, the Climate Action Secretariat at the Ministry of Environment has confirmed that all additional organics diverted by municipal governments post-Charter (i.e. September 27, 2007 to December 31, 2012) are eligible for credits for the 2012 reporting year based on the GCC Household Organic Waste Composting project profile.

1.3 Project Eligibility Statement

Metro Vancouver asserts that the 2012 Project Report for the crediting period meets all eligibility requirements of the BC Green Communities Committee's (GCC) "Becoming Carbon Neutral Guidebook".

Project Eligibility Requirements:

1. Emission reductions are outside the local government corporate emissions boundary, as defined in the Carbon Neutral Workbook
    - Emissions associated with solid waste disposal sites (including landfills and composting facilities) are outside the corporate boundary, according to the Workbook.
2. Emission reductions have occurred before they are counted
    - The emission reductions being claimed for 2012 are associated with additional organics diversion activities that have occurred by the end of that year. The GCC Organics

Diversion calculator uses a landfill-specific methane generation model to determine the avoided methane emissions due to diversion over the 100 year period after the year in which the diversion occurred.

3. Emission reductions are credibly measured
    - Option 1 (GCC Supported Projects) are considered to meet this Project Eligibility Requirement. Emission reductions have been calculated using the Organics Diversion Calculator provided by the Green Communities Committee.
4. Emission reductions projects are beyond business as usual (BAU): projects must have started after September 26, 2007; must not be required to fulfill a federal or provincial government's legislated or regulatory requirement; and meet one of three tests (financial, other barriers or common practice).
    - Option 1 (GCC Supported Projects) are considered to meet this Project Eligibility Requirement.
5. Accounting of emission reductions is transparent
    - This public report provides details of the emission reduction accounting.
6. Emission reductions are counted only once:
    - Metro Vancouver has calculated the emission reductions from household organic waste diversion based on the regional waste flow data that it is responsible for collecting (and validating) from the municipalities in the region. The emission reductions claimed in this report have not been previously committed or sold as emission reductions.
7. Project proponents have clear ownership of all emission reductions:
    - The local governments claiming emission reductions under this profile assert that they have exclusive rights to the legal and commercial benefits of reductions associated with household organic waste diversion. Metro Vancouver makes no claim of ownership to the emission reductions associated with municipal diversion of household organic waste.

1.4 Contact Information

Contact information for the Project Designate and Project Developer are provided in Tables 1 and 2 below.

Table 1 Project Designate Contact Information

Contact Name and Title:	Roger Quan, Division Manager, Air Quality Policy and Management
Company:	Metro Vancouver
Roles and Responsibilities:	Project Designate
Address:	4330 Kingsway, Burnaby, BC V5H 4G8
Telephone:	604-436-6770
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E-mail:	Roger.Quan@metrovancouver.org

Table 2 Project Developer Contact Information

Contact Name and Title:	Conor Reynolds, Senior Project Engineer (Primary Contact) Ali Ergudenler, Senior Engineer (Alternate Contact)
Company:	Air Quality Policy & Management Division Planning, Policy and Environment Department Metro Vancouver
Roles and Responsibilities:	Project Plan Developers
Address:	4330 Kingsway, Burnaby, BC V5H 4G8
Telephone:	604-456-8811 (Conor Reynolds) 604-436-6774 (Ali Ergudenler)
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2.0 PROJECT DESCRIPTION

2.1 GHG Assertion

This Project Report summarizes the regional household organic waste diversion activities, as reported to Metro Vancouver by the Municipalities, between 2006 and 2012 inclusive. During the crediting period from September 26, 2007 to December 31, 2012, the project activity resulted in a total GHG emissions reduction of 64,796 tonnes CO_2 equivalent.

2.2 Data and Calculations

2.2.1 Organic Waste Diversion Data

Metro Vancouver's Solid Waste Department receives information from municipalities on solid waste diversion activities annually, including tonnes of municipal solid waste (MSW), recycling and organics (yard trimmings and food scraps) collected by municipal programs. These data are combined with data from Metro Vancouver's transfer stations, private recycling processors, extended producer responsibility (EPR) stewards and the three regional final disposal sites (Cache Creek Landfill, Vancouver Landfill and the Waste to Energy Facility), to provide a complete picture of waste management activities in the region.

The critical factor determining whether a municipality receives GCC carbon credits is whether they collected additional organics in 2007-2012, above and beyond the amount collected in the 2006 baseline year. Attachment A provides the diverted organics by municipality, as reported to Metro Vancouver by the municipal solid waste coordinators, for 2006-2012, and the proportion eligible for carbon credits (in 2007-2012) based on the GCC's additionality criteria. Local Governments maintain auditable records of their organics diversion programs, including the quantity of organic waste collected in 2006 (the "baseline year") and each year since that time, whether food scraps collection was included in the program, and the type of composting facility that receives the diverted organics.

2.2.2 Regional Approach to Carbon Credits

The organics diversion calculator spreadsheet requires information about the final disposal of municipal solid waste (MSW) in order to determine avoided emissions. Only organic waste diverted from landfills are eligible to earn credits, whereas organic waste that is diverted from a Waste-to-Energy facility does not. Metro Vancouver has the Provincially-delegated responsibility for the management of all of the waste for the region, whether it is dropped off at a Metro Vancouver owned transfer station or direct-hauled to one of the three disposal facilities.

Given the complexities of the solid waste management system in the Metro Vancouver region, individual municipalities do not decide which final disposal facility their solid waste would go to – this decision is based on system efficiencies. Furthermore, individual municipalities cannot identify where the solid waste they collect is disposed of. The only exceptions are the City of Vancouver and the Corporation of Delta, because they both use the Vancouver Landfill as their waste disposal site.

Therefore, Metro Vancouver staff have used waste flow data for the region (except City of Vancouver and Delta) to determine the fractions of single-family solid waste that are sent to the three final disposal facilities (Table 3). This regional approach has been endorsed by Metro Vancouver's Regional Engineers Advisory Committee and its Climate Protection Subcommittee and Solid Waste Subcommittee, and agreed by the Green Communities Committee.

Table 3 Proportions of Waste Sent to Each of the Three Final Disposal Facilities for the Region (Applies to all municipalities except City of Vancouver and Corporation of Delta).

Year	WTEF	VLF	CCLF
2007	29.9%	27.4%	42.7%
2008	29.2%	26.7%	44.1%
2009	30.7%	25.8%	43.5%
2010	32.2%	22.4%	45.4%
2011	35.7%	30.3%	34.0%
2012	37.0%	31.4%	31.6%

2.2.2 Using the Green Communities Organics Diversion Calculator

The Provincial Calculator was used to calculate the carbon credits by municipality, by year. In accordance with the Profile, the ratio of food scraps to yard trimmings in the additional diverted household organic waste was assumed to be 50:50. The composting facilities used by Municipalities in Metro Vancouver during the Project Period are all categorized as "Forced Aeration Compost (Optimized)".

The key inputs to the calculator were:

- The regional proportion of MSW sent to each of the three final disposal sites by year, as determined by Metro Vancouver; this applies to all municipalities except City of Vancouver and Corporation of Delta (Table 3);
- The landfill gas collection efficiencies for the Vancouver Landfill and Cache Creek Landfill, by year, as provided in the facilities' public reports (Table 4).

Table 4 Landfill Gas Collection Efficiency, by year, for Vancouver Landfill and Cache Creek Landfill.

Year	VLF	CCLF
2007	50%	39%
2008	37%	47%
2009	39%	44%
2010	47%	40%
2011	38%	65%
2012	58%	71%
2013*	72%	73%
2014*	75%	75%
2015*	75%	75%
2016*	75%	75%

* Landfill gas (LFG) collection efficiencies up to and including 2012 are based on modeled LFG generation and actual LFG collection data; while efficiencies post 2012 are estimated from modeled generation and projected collection. Collection efficiencies greater than 75% are reported as 75%, according to the guidance in the GCC Organics Diversion Profile.

The factors presented in Tables 3 and 4 were used in the Organics Diversion Calculator to determine the GCC carbon credits from diverting one tonne of additional organic waste from disposal at the three facilities (Table 5). This "carbon credit factor" (i.e. amount of credits per tonne organics diverted) decreases over time because of improvements to the landfill gas collection systems at the two landfills.

Table 5 GCC Carbon Credits (tonnes CO2e) per tonne of diverted organic waste.
(Applies to all municipalities except City of Vancouver and Corporation of Delta).

Year	GCC Carbon Credits (tonnes) per tonne of diverted organics
2007	0.41
2008	0.39
2009	0.36
2010	0.32
2011	0.29
2012	0.26

Using the factors presented in Table 5, the number of carbon credits available to each municipality for the 2012 reporting year was calculated, and these are presented in the table in Attachment B. Note that carbon credits for City of Vancouver and Delta were calculated separately, assuming 100% waste disposal at Vancouver Landfill. The number of new GCC carbon credits available in 2013 and future years will depend on the amount of eligible organics diversion activity in those years and the 2013 inputs to the calculators (i.e. updated versions of Tables 3 and 4).

3.0 OWNERSHIP OF CREDITS

The member municipalities of Metro Vancouver are solely responsible for the household organics diversion programs in their jurisdictions, and are hence identified as the owners of the corresponding carbon credits. Individual municipalities will choose whether to include these green community credits in their final Carbon Neutral Reports as part of the Climate Action Revenue Incentive Program. Metro Vancouver does not claim rights to the credits associated with this organics diversion GHG reduction project.

4.0 REFERENCES AND SUPPORTING DOCUMENTS

B.C. Climate Action Toolkit. "Carbon Neutral Local Government". Available at: http://www.toolkit.bc.ca/resource/becoming-carbon-neutral-workbook-and-guidebook

Green Communities Committee. 2012. "Becoming Carbon Neutral: A Guidebook for Local Governments in British Columbia". Version 2, July 2011. Available at: http://www.toolkit.bc.ca/resource/becoming-carbon-neutral-workbook-and-guidebook#becoming

Green Communities Committee. 2012. "The Workbook. Helping Local Governments Understand How to be Carbon Neutral in their Corporate Operations ". Available at: http://www.toolkit.bc.ca/resource/becoming-carbon-neutral-workbook-and-guidebook

Green Communities Committee. 2012. "Green Communities Carbon Neutral Framework Option 1 Profile: Household Organics Waste Composting". Available at: http://www.toolkit.bc.ca/resource/becoming-carbon-neutral-workbook-and-guidebook

Province of British Columbia. 2007. "Climate Action Charter". Available at: http://www.livesmartbc.ca/community/charter.html

APPENDIX A: TONNES OF ORGANICS DIVERTED

Table 6 Mass of Household organics (tonnes) diverted by Municipalities in Metro Vancouver, 2006-2012

	2006 [1]	2007 [2]		2008		2009		2010		2011		2012	
Municipality	Baseline Organics (tonnes)	Diverted Organics (tonnes)	Eligible Organics	Diverted Organics (tonnes)	Eligible Organics (tonnes)	Diverted Organics (tonnes)	Eligible Organics (tonnes)	Diverted Organics (tonnes)	Eligible Organics (tonnes)	Diverted Organics (tonnes)	Eligible Organics (tonnes)	Diverted Organics (tonnes)	Eligible Organics (tonnes)
Anmore	0	0	0	0	0	0	0	0	0	0	0	0	0
Belcarra	0	0	0	0	0	0	0	0	0	0	0	0	0
Bowen Island, Elec B&C	50	82	9	96	46	112	62	0	0	0	0	0	0
Burnaby	9,634	10,123	129	9,979	345	9,655	21	12,714	3,080	13,050	3,416	14,410	4,776
Coquitlam	4,612	5,261	171	6,466	1,854	6,649	2,037	7,692	3,080	7,923	3,311	8,295	3,684
Delta	5,732	6,358	165	7,552	1,820	6,954	1,222	7,947	2,215	8,405	2,673	10,242	4,510
Langley City	504	0	0	1,211	707	1,010	506	1,138	634	1,138	634	1,138	634
Langley Township	3,433	3,206	0	5,388	1,955	5,267	1,834	5,992	2,559	6,733	3,300	7,884	4,451
Lions Bay	0	126	33	165	165	47	47	89	89	88	88	88	88
Maple Ridge	0	0	0	0	0	0	0	0	0	0	0	0	0
New Westminster	0	0	0	115	115	420	420	922	922	3,111	3,111	3,777	3,777
North Vancouver City	1,152	1,261	29	1,425	273	1,533	381	1,475	323	1,528	376	1,706	554
North Vancouver District	4,511	4,601	24	4,601	90	5,747	1,236	5,390	879	5,619	1,108	6,165	1,654
Pitt Meadows	0	0	0	0	0	0	0	0	0	0	0	1,139	1,139
Port Coquitlam	3,186	3,537	92	3,865	679	3,867	681	5,058	1,872	5,371	2,185	5,549	2,363
Port Moody	1,200	1,040	0	1,249	49	1,450	250	1,908	708	2,887	1,687	2,901	1,701
Richmond	7,783	10,075	603	9,443	1,660	8,904	1,121	9,434	1,650	9,900	2,117	10,549	2,765
Surrey	17,962	20,044	548	22,359	4,397	24,333	6,371	26,444	8,482	27,000	9,038	27,727 [3]	9,765
UBC/UEL	0	0	0	143	143	211	211	161	161	155	155	172	172
Vancouver	17,700	15,950	0	21,400	3,700	22,400	4,700	24,640	6,940	25,220	7,520	27,445	9,745
West Vancouver	3,184	3,436	66	3,647	463	3,906	722	3,773	589	4,023	839	4,458	1,274
White Rock	0	0	0	872	872	1,132	1,132	1,459	1,459	1,459	1,459	1,680	1,680
Total Eligible Organics:			*1,867*		*19,333*		*22,954*		*35,643*		*43,018*		*54,733*

[1] The "Baseline" level of organics diversion is 2006. Eligible organics are the additional amount each year above and beyond the baseline amount.

[2] In 2007, eligible diverted organics are pro-rated to post-Charter (i.e. after September 26th, not the whole year).

[3] City of Surrey implemented a new organics collection program on October 1, 2012, so they are reporting only organics collected during the first 9 months of 2012.

APPENDIX B: MUNICIPAL CARBON CREDITS

Table 7 Green Communities Organics Diversion Carbon Credits (tonnes CO2e) by Municipality, 2007-2012

Municipality	2007 [2]	2008	2009	2010	2011	2012	Aggregate (2007-12) [1]
	Tonnes CO2e	Tonnes CO2e	Tonnes CO2e	Tonnes CO2e	Tonnes CO2e	Tonnes CO2e	Tonnes CO2e
Anmore	0	0	0	0	0	0	***0***
Belcarra	0	0	0	0	0	0	***0***
Bowen Island, Electoral B&C	3	18	22	0	0	0	***43***
Burnaby	52	135	7	985	992	1,247	***3,418***
Coquitlam	69	723	727	985	962	961	***4,429***
Delta [2]	114	1,219	751	1,236	1,371	1,987	***6,678***
Langley City	0	276	181	203	184	166	***1,009***
Langley Township	0	762	655	819	958	1,162	***4,356***
Lions Bay	13	64	17	28	25	23	***171***
Maple Ridge	0	0	0	0	0	0	***0***
New Westminster	0	45	150	295	904	986	***2,379***
North Vancouver City	12	106	136	103	109	145	***611***
North Vancouver District	10	35	441	281	322	432	***1,521***
Pitt Meadows	0	0	0	0	0	297	***297***
Port Coquitlam	38	265	243	599	635	617	***2,396***
Port Moody	0	19	89	227	490	444	***1,269***
Richmond	245	647	400	528	615	722	***3,157***
Surrey	223	1,715	2,275	2,714	2,625	2,549	***12,099***
UBC/UEL	0	56	75	51	45	45	***273***
Vancouver [2]	0	2,478	2,887	3,870	3,857	15,210	***17,387***
West Vancouver	27	181	258	188	244	333	***1,230***
White Rock	0	340	404	467	424	438	***2,073***
Totals:	*807*	*9,084*	*9,719*	*13,580*	*14,761*	*27,762*	**64,796**

[1] GHG reduction credits ("carbon credits") available for the 2012 reporting year are the sum of all eligible credits since the signing of the Charter.
[2] City of Vancouver and Delta are signatories to a Tripartite Agreement on Solid Waste with Metro Vancouver, which stipulates that all their waste goes to Vancouver Landfill; therefore their carbon credits are calculated directly using the Organics Diversion Calculator rather than by using the Regional Approach (as described in this report).

APPENDIX C: GREEN COMMUNITIES FRAMEWORK SELF-CERTIFICATION FORM FOR OPTION 1 PROJECT – HOUSEHOLD ORGANIC WASTE COMPOSTING IN METRO VANCOUVER

Project Proponent Information	
Name of Local Government Project Proponent(s)	*Project Developer:* Metro Vancouver *Local Governments Claiming Reductions:* Municipalities in the Metro Vancouver Region
Project Designate appointed to sign off on the Self-certification Form	Name: Roger Quan Title: Division Manager, Air Quality Policy and Management Phone: 604-436-6770 Email: Roger.Quan@metrovancouver.org
Project Developer Contact	Name: Conor Reynolds Title: Senior Project Engineer Phone: 604-456-8811 Email : Conor.Reynolds@metrovancouver.org
Project Information	
Project Report Title	Household Organic Waste Composting in Metro Vancouver: Greenhouse Gas Emission Reductions and Green Community Carbon Credits for Carbon Neutral Reporting [***X***] Copy of Project Report attached
Timing and Amount of reductions being claimed	The GHG emission reductions of 64,796 tonnes CO2 equivalent are claimed from this project, from activities between September 27, 2007 and December 31, 2012.
Certification that the required work occurred	[***X***] I declare that the project work required to achieve the GHG reductions from this project as estimated by the project profile used, actually occurred during the years in which they are identified, and will be claimed in 2012 as per the Project Eligibility Requirements outlined in Appendix 1 of the *Becoming Carbon Neutral* Guidebook.
Self Certification: Authorization and Sign off	
Project Designate Statement	I declare that the information provided in this self-certification form is to the best of my knowledge correct and complete.
Project Designate Signature:  Title: Division Manager, Air Quality Policy and Management	Date: July 3, 2013