City of Corvallis

2012 Community Greenhouse Gas Inventory Report

Photo by Paul Bausch, 2013

> We envision that in 2020 Corvallis will be a highly livable city which employs local benchmarks to measure its progress in areas such as housing, economic vitality, educational quality, environmental quality, and overall quality of life.
>
> - The Corvallis 2020 Vision Statement

The City of Corvallis Sustainability Program completed this Community Greenhouse Gas Inventory with support from a grant provided by the Environmental Protection Agency's Climate Showcase Communities Program.

The grant was awarded for Energize Corvallis, a strategic collection of residential energy efficiency programs managed in partnership by the City of Corvallis, the Corvallis Environmental Center, OSU Benton County Extension, and The Resource Innovation Group.

Acknowledgements

The City of Corvallis thanks all the individuals and organizations below who assisted with technical questions, data, and other information that was vital to completing the greenhouse gas inventory. A special thanks to Tom Ekstedt, an exceptional community volunteer, who provided insight, knowledge, and an investigative sense to the information-gathering phase of the inventory process.

Community Volunteer
Tom Ekstedt

City of Corvallis
Dan Hanthorn
Kris De Jong
Adam Steele
Melissa Powel

Community Partners
Corvallis Area Metropolitan Planning Organization, Ali Bonakdar
Oregon Department of Transportation, Sam Ayash and Tara Weidner
Pacific Power
Consumers Power Inc.
NW Natural Gas

Funding Source
Environmental Protection Agency – Climate Showcase Communities Grant Program

ICLEI-Local Governments for Sustainability USA
J.R Killigrew, Program Officer - Climate & Membership Services

Greenhouse gas inventory and report prepared by:
Scott Dybvad, Sustainability Program Specialist, City of Corvallis
Scott.Dybvad@CorvallisOregon.gov
(541) 766-6331

Photo credit: Corvallis Sunset by Paul Bausch, November 2013, www.flickr.com/photos/pb/10793954744/

Table of Contents

Summary of Key Findings

In order to provide information for the community's efforts to better understand its climate impact, the City of Corvallis conducted a Community Greenhouse Gas Inventory for Corvallis, Oregon for the 2012 calendar year. The city limits serve as the physical boundaries. The inventory was completed under the U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, a methodology developed by ICLEI – Local Governments for Sustainability and released in October, 2012. Emissions sources included in the inventory cover the broad categories of stationary emissions, electricity, transportation, solid waste, and the emissions associated with household and government consumption of food, goods and services. This inventory should serve as a baseline for future inventories and to track the community's impact.

Total emissions

Total emissions in 2012 for the Corvallis community are estimated at 1,257,115 Metric Tons Carbon Dioxide Equivalent (MT CO_2e). The chart below summarizes the findings based on the five Basic Emissions Generating Activities plus Household and Government Consumption.

Corvallis Community Greenhouse Gas Emissions – 2012
1,257,115 Metric Tons Carbon Dioxide Equivalent (MT CO_2e)

Food and Goods
Estimated emissions: 507,270 MT CO2e

Electricity
Estimated emissions: 341,895 MT CO2e

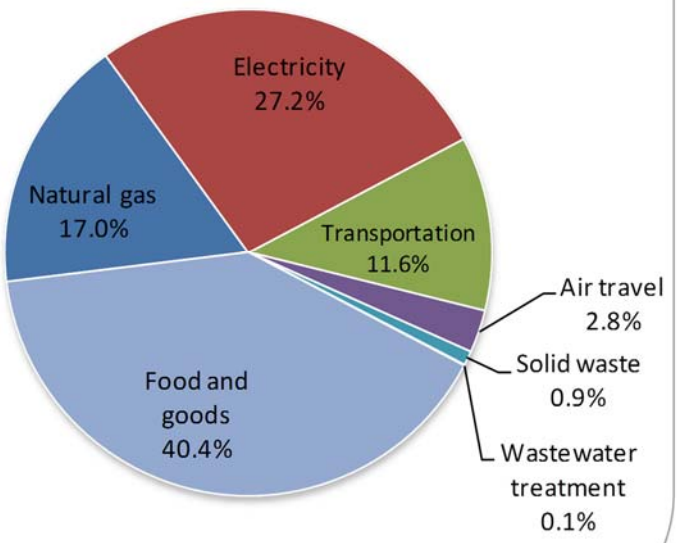
Natural Gas
Estimated emissions: 213,453 MT CO2e

Transportation
Estimated emissions: 146,273 MT CO2e

Air Travel
Estimated emissions: 35,603 MT CO2e

Solid Waste
Estimated emissions: 11,924 MT CO2e

Wastewater Treatment
Estimated emissions: 698 MT CO2e



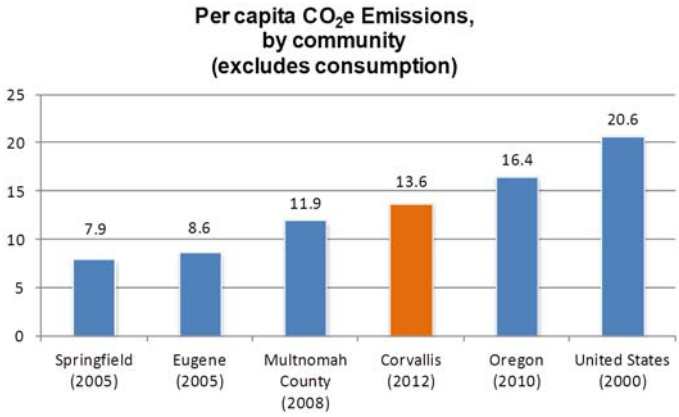
Comparison of emissions

It is useful to compare a community's emissions over time to determine whether emissions are increasing or decreasing and to uncover any changes in where emissions are generated. For this community inventory, only one year's data was analyzed, so comparisons over time are not available.

It can also be insightful to compare the greenhouse gas (GHG) emissions of one community to other communities. But for those comparisons to be effective they must compare similar measures. To ensure better results, greenhouse gas inventory comparisons should:

1. Include similar GHG emission generating activities and sources, such as whether emissions from consumption are included,
2. Compare communities with similar circumstances, such as whether a landfill falls within a community's boundaries, and
3. Use similar methodologies to calculate emissions.

These factors limit the number of possible comparisons. Additionally, few locations have completed greenhouse gas inventories of any kind and of those that have, even fewer compile data regularly. However, when those factors are met, communities of any size can compare results when per capita figures are used.



With those factors in mind, the chart on the right shows per capita GHG emissions, excluding consumption associated emissions, for several locations. It is important to note the different time periods covered and that some broad assumptions had to be made for this comparison (e.g. the inclusion of air travel or whether transportation models have the same assumptions around the types of travel included). For context, U.S. greenhouse gas emissions slowly increased until 2007 then declined to the point where 2012 emissions were roughly equal to 1994 levels.

This report can serve as a starting point for informed decisions to reduce the community's greenhouse gas emissions. An electronic version of this report, data gathered for the inventory, equations, emissions factors, and assumptions can be found on the City of Corvallis website at www.corvallisoregon.gov/communityGHGinventory.

Methodology

In order to quantify GHG emissions in a way that is useful to local government and the community, it is important to use a standardized approach. This inventory uses the approach and methods provided by the U.S. Community Protocol for Accounting and Reporting Greenhouse Gas Emissions[1] (Protocol), released by ICLEI – Local Governments for Sustainability in October, 2012.

The Protocol establishes reporting requirements for all community GHG emissions inventories, provides detailed accounting guidance for quantifying GHG emissions associated with a range of emission sources and community activities, and provides a number of optional reporting frameworks.

This Protocol is the national standard for U.S. local governments to account for and report on greenhouse gas emissions associated with their communities. Use of the Protocol provides an accepted methodology to estimate and report on GHG emissions associated with the community. This allows for more informed decisions about how and where to pursue GHG emissions reduction opportunities.

This Protocol requires inclusion of five Basic Emissions Generating Activities in their GHG emissions inventories:

1. Use of electricity by the community
2. Use of fuel in residential and commercial stationary combustion equipment
3. On-road passenger and freight vehicle travel
4. Use of energy in potable water treatment and distribution and wastewater collection and treatment
5. Generation of solid waste by the community

In addition to these five Basic Emissions Generating Activities, this inventory also estimates the emissions associated with the manufacturing and production of food, goods, and services consumed by Corvallis households and local government. Consumption generates emissions all over the world from activities such as mining, manufacturing, and transportation.

[1] http://www.icleiusa.org/tools/ghg-protocol/community-protocol

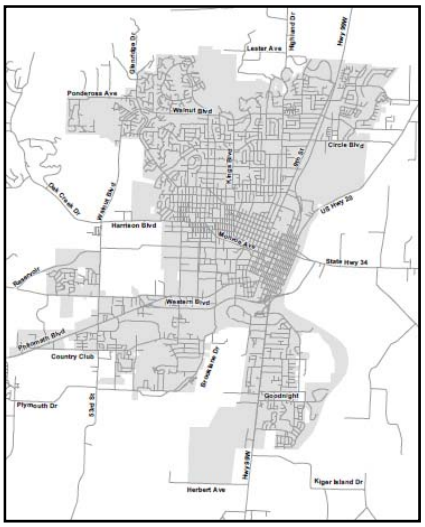
Community Emissions Inventory Results

This section provides technical details used in developing this greenhouse gas inventory. The intent is to provide information that advances consistent, comparable, and relevant quantifications of community GHG emissions. Greater detail is available in the appendix and on the City's website.

Community Profile

The first step in any greenhouse gas inventory is to determine its parameters – the timeframe, the physical boundaries, the emission sources to be included, and the methodology used to gather and translate data into emissions. Corvallis' city limits serve as the boundary for this inventory and calendar year 2012 is the timeframe for which emissions were calculated. Information on Corvallis' population and housing units comes from Portland State University and the U.S. Census Bureau.

Estimated 2012 Corvallis Population[2]	55,055
Estimated 2010 Corvallis Housing Units[3]	23,423



Corvallis city limits, 2012

Emissions Data and Sources

This section provides details about the various sources and activities that generate emissions. Data sources and emissions factors and calculations are described with some detail here and with greater detail in the Protocol and on the website.

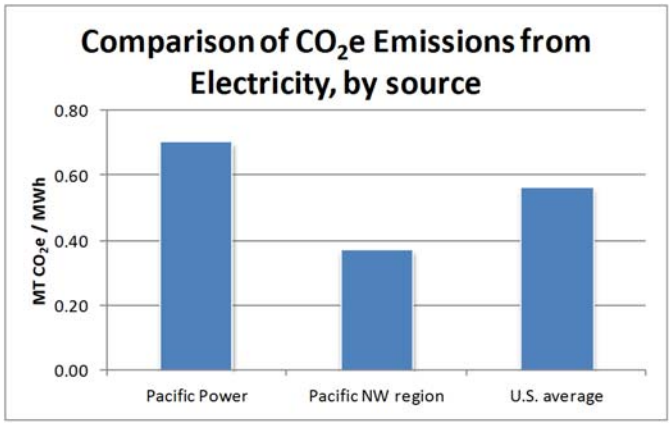
Emissions from Electricity Use

This category estimates emissions associated with the production of electricity used in the community. Estimating emissions from electricity use is fairly straightforward. Electricity in Corvallis is purchased from two utilities, Pacific Power and Consumers Power, Inc. Both utilities provided community usage data for the inventory year. A breakdown of electricity usage by residential, commercial, and industrial users was not available.

[2] Portland State University population estimate 2012 http://www.pdx.edu/prc/population-estimates-0
[3] U.S. Census data 2010 http://www.census.gov/2010census/popmap/ipmtext.php?fl=41:4115800

Emissions from Electricity Use						
341,265 MT CO_2e	**Usage data**		**Emissions factors**			**Method**
	Value	**Unit**	**Value**	**Unit**	**Source**	
Pacific Power	482,488	MWh*	0.7040	MT CO_2e/MWh	PacifiCorp	BE 2.1
Consumers Power Inc.	45,487		0.3842		eGRID	
Method and data source notes: Usage data for 2012 from Pacific Power and Consumers Power. Emissions factors for Pacific Power from PacifiCorp for 2012 and for Consumers Power from eGRID's NWPP WECC emissions factors for 2010[4]. *MWh = Megawatt hour = 1,000 Kilowatt hours (kWh)						

Overall, emissions related to electricity account for a little over 27% of the community's emissions. This high percentage may surprise some due to the Pacific Northwest's reputation for having a large portion of the region's electricity generated through hydropower. While this may be true for the region as a whole, the generation mix of some providers relies more heavily on fossil fuels. Pacific Power, which provided over 91% of the electricity used in the community in 2012, generates 67% of their electricity from coal and 13% from natural gas[5]. The chart at right shows a comparison of CO_2e emissions from electricity by source.



Electric Power Transmission and Distribution Losses

When electricity is transmitted through power lines, a certain amount is lost as heat. Of the community's electricity consumption, roughly 6.8% is lost during transmission and distribution.

Electric Power Transmission and Distribution Losses						
629 MT CO_2e	**Activity data**		**Emissions factors**			**Method**
	Value	**Unit**	**Value**	**Unit**	**Source**	
Community electricity use	527,976	MWh	6.84	Grid Gross Loss (%)	eGRID	BE 4.1
Method and data source notes: From EPA's Year 2010 eGRID 9th edition Grid Gross Loss (%) at http://www.epa.gov/cleanenergy/energy-resources/egrid/index.html						

[4] EPA's eGRID Summary Tables http://www.epa.gov/cleanenergy/documents/egridzips/eGRID_9th_edition_V1-0_year_2010_Summary_Tables.pdf

[5] Oregon Department of Energy's "Where does Oregon's Electricity come from?" website http://www.oregon.gov/energy/pages/oregons_electric_power_mix.aspx

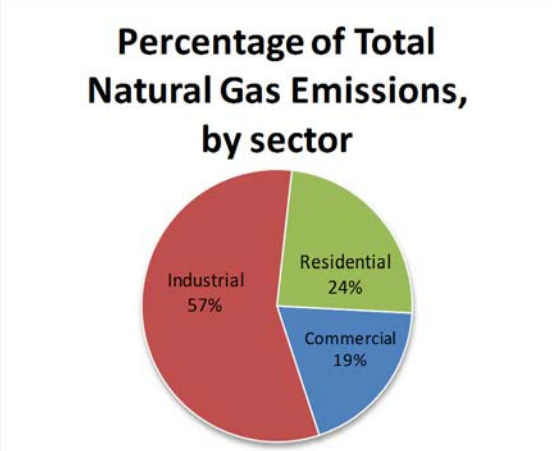
Emissions from Stationary Fuel Combustion

This broad category covers activities which directly combust fuels for the production of heat for space heating, process heating, and cooking. While there are multiple types of fuels used for these applications, in Corvallis, as in most communities, natural gas is by far the most widely used. NW Natural Gas is the sole supplier to the community, so usage data was relatively easy to obtain. Usage data for other fuel types, from biomass fuels such as wood to petroleum products like distillate fuel oils, are much more difficult to determine and were not included in this inventory.

Emissions from Stationary Fuel Combustion						
172,526 MT CO_2e	**Usage data**		**Emissions factors**			**Method**
	Value	**Unit**	**Value**	**Unit**	**Source**	
Natural gas	3,248,565	MMBtu*	.05302 CO2 5 x 10^{-6} CH_4 1x10^{-7} N_2O	MT/MMBtu	Protocol	BE 1.1
Method and data source notes: Therms provided by NW Natural Gas for usage in 2012 multiplied by Pipeline (US Weighted Average) emission factor found in the Community Wide Protocol Appendix C Table B.1 *MMBtu = one million British Thermal Units (BTU)						

Data for residential, commercial, and industrial uses was available from NW Natural Gas. Usage and emissions data by sector is shown here.

2012 Natural Gas Usage by Sector			
	Industrial	**Residential**	**Commercial**
Usage (MMBtu)	1,845,843	781,378	621,344
Emissions (MT CO_2e)	97,963	41,535	33,028



Upstream Emissions from Stationary Fuel Combustion

This category considers the energy used to extract, process and deliver fuels (in this case, natural gas) to the combustion point. These emissions refer only to the process of producing fuels, not the emissions associated with infrastructure, such as mines or refineries, or disposal of spent fuels.

Upstream Emissions from Stationary Fuel Combustion						
40,927 MT CO_2e	**Activity data**		**Emissions factors**			**Method**
	Value	**Unit**	**Value**	**Unit**	**Source**	
Natural Gas	3,248,565	MMBtu	445	Kg CO_2e / Thousand Cubic Meters	Protocol	BE 5.1
Method and data source notes: 2012 natural gas usage provided by NW Natural. Upstream emissions factors used in Protocol obtained from National Renewable Energy Laboratory (2007) and Oregon Department of Environmental Quality (2012).						

Passenger Vehicles

Passenger vehicle emissions consist of direct emissions from the combustion of petroleum-based fuels by internal combustion engine passenger cars and light duty trucks. Most inventory protocols seek to calculate emissions from trips that begin or end within the boundary. Those trips can be internal-internal (all travel is within the boundary), internal-external (travel begins within the boundary and ends outside the boundary), or external-internal (travel begins outside the boundary and ends within the boundary).

For this inventory, ICLEI's Protocol was not used to estimate emissions due to the lack of necessary data. Instead, Oregon's Department of Transportation (ODOT) recently prepared transportation demand modeling for the Corvallis Area Metropolitan Planning Organization (CAMPO) using their widely accepted GreenSTEP modeling tool. Outputs from that model were used to determine emissions for Corvallis.

Passenger Vehicles					
116,622 MT CO_2e	**Activity data**				**Method**
	Value	**Unit**	**Value**	**Unit**	
All Household Vehicles in CAMPO	843,268	VMT*	81.7%	MPO population in Corvallis city limits	ODOT's GreenSTEP
Method and data source notes: Emissions were estimated using ODOT's GreenSTEP Model, which was evaluated at the county and Metro Area (or CAMPO) levels using 2010 data. Corvallis-only data was then disaggregated from the Metro Area data and includes only internal-internal, internal-external, and external-internal travel as ICLEI does not recommend including external-external (or pass-through) travel. *VMT = Vehicle Miles Traveled					

Freight and Service Trucks

This category includes direct emissions from freight and service on-road transportation, including medium and heavy-duty trucks. Outputs from ODOT's GreenSTEP modeling tool were again used to determine emissions for the Corvallis community. Only internal-internal, internal-external, and external-internal trips were included.

Freight and Service Trucks					
28,513 MT CO_2e	**Activity data**				**Method**
	Value	**Unit**	**Value**	**Unit**	
All Commercial Service Trucks in CAMPO	109,625	VMT	91.4%	MPO employment in Corvallis city limits	ODOT's GreenSTEP
All Heavy Duty Trucks in CAMPO	33,725	VMT	57%	CAMPO highway miles within Corvallis city limits	
Method and data source notes: Emissions were estimated using ODOT's GreenSTEP Model, which was evaluated at the county and Metro Area (or CAMPO) levels using 2010 data. Corvallis-only data was then disaggregated from the Metro Area data and includes only internal-internal, internal-external, and external-internal travel as ICLEI does not recommend including external-external (or pass-through) travel.					

Transit

This category includes direct emissions from the combustion of petroleum-based fuel by internal combustion engine transit vehicles in the Corvallis Transit System. Actual fuel usage data was used to calculate related emissions. Emissions from fuel use for Benton County's special and regional transportation systems, such as Dial-A-Bus or the Linn-Benton Loop, were not estimated.

Transit			
1,138 MT CO_2e	**Activity data**		**Method**
	Value	**Unit**	
Transit	88,982	gallons biodiesel (B5)	EDF / NAFA Fleet Emissions Calculator
Method and data source notes: 2012 City of Corvallis transit fuel usage data used in Environmental Defense Fund (EDF) / NAFA Fleet Management Association Fleet Greenhouse Gas Emissions Calculator.			

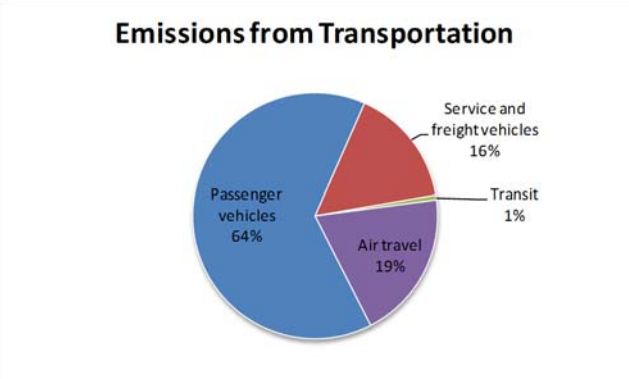
Air Travel

This category is a component of the consumption-based emissions accounting, which estimate the global emissions associated with household purchase and use of products and services. Estimates were produced using the CoolClimate Calculator and multiplying by the number of households in the community. The Calculator's results estimated the average Corvallis household contributes 1.52 MT CO_2e each year through air travel. This is roughly equivalent to one round-trip flight from Portland to New York City with one stopover per household per year.

Air Travel			
35,603 MT CO_2e	**Activity data**		**Method**
	Value	**Unit**	
Air Travel	1.52	MT CO_2e / household	CoolClimate Carbon Footprint Calculator by University of California, Berkeley
Method and data source notes: Emissions estimates obtained from the CoolClimate Carbon Footprint Calculator, then Air Travel emissions itemized separately. Household unit data from U.S. Census Bureau.			

Transportation Summary

Overall, transportation emissions, including air travel, account for over 14% of the community's GHG emissions. The chart on the right shows the various sources of transportation emissions and their contribution to the total. By far the biggest contributor is passenger vehicles. The second largest source of transportation emissions is from air travel, followed by service and freight vehicles. Transit contributes a very small amount to overall transportation emissions.



Wastewater

Wastewater treatment processes create emissions when microorganisms degrade the soluble organic material in wastewater under anaerobic conditions, creating methane (CH_4) and nitrous oxide (N_2O) and carbon dioxide (CO_2). During collection and treatment, wastewater may be unintentionally or deliberately managed under anaerobic conditions, potentially releasing some uncaptured or uncombusted CH_4 into the environment.

Wastewater **698 MT CO_2e**	**Activity data**			
	Value	**Unit**	**Source**	**Method**
CH_4 Emissions from Combustion of Anaerobic Digester Gas	0.93	MT CO_2e	Protocol	WW.1.b
N_2O Emissions from Combustion of Anaerobic Digester Gas	27			WW.2.b
Process N_2O Emissions from Treatment Plants with Nitrification or Denitrification	149			WW.7
Fugitive N_2O Emissions from Effluent Discharge	521			WW.12(alt)
Method and data source notes: Wastewater treatment data from City of Corvallis Wastewater Recovery Plant report to the Department of Environmental Quality. 61,100 ft^3 of digester gas produced per day with BTU content of 619 BTU / ft^3.				

Community-generated Waste Sent to Landfills

This category determines emissions that occur as a result of waste disposed of by a community's population. This method estimates emissions resulting from solid waste generated in Corvallis and deposited in 2012 at the Coffin Butte Landfill. Because of the lack of widely accepted and standardized data and guidance, the Protocol does not include methodologies to estimate emissions from composting.

Community-generated Waste Sent to Landfills **11,272 MT CO_2e**	**Activity data**		**Emissions factors**			**Method**
	Value	**Unit**	**Value**	**Unit**	**Source**	
Community Waste to Landfills	39,760	Wet short tons	0.06	MT CH_4 / wet short ton	Protocol	SW.4
			0.75	Landfill Gas collection efficiency		
			0.1	Oxidation rate		
Method and data source notes: Corvallis community waste tonnage reported in Republic Services 2012 Annual Report.						

Process Emissions Associated with Landfilling

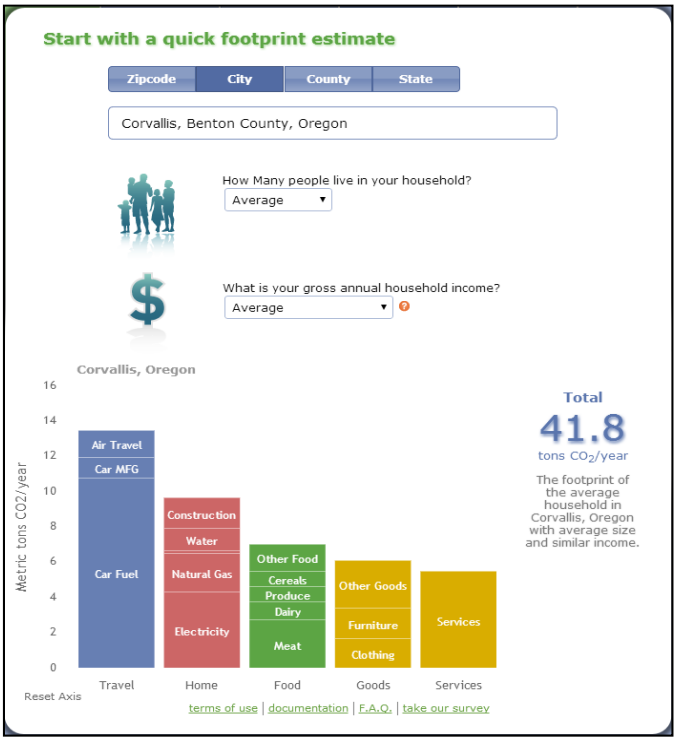
To get a complete picture of the emissions associated with landfilling, it is important to include transport emissions and process emissions, which come from powering the equipment needed to manage the landfill.

Process Emissions Associated with Landfilling						
652 MT CO_2e	**Activity data**		**Emissions factors**			**Method**
	Value	**Unit**	**Value**	**Unit**	**Source**	
Process Emissions Associated with Landfilling	39,760	Wet short tons	0.0164	MT CO_2e / wet short ton	Protocol	SW.5
Method and data source notes: Corvallis community waste tonnage reported in Republic Services 2012 Annual Report.						

The emissions related to solid waste collection and transportation are another source of GHG emissions. Those are already accounted for in the Freight and Service Trucks emissions and were not itemized separately.

Household and Government Supply Chain Emissions

The methodology used to estimate supply chain emissions is based on average emissions factors for various sectors of the U.S. economy. Consumption emissions for an average Corvallis household, at right, were obtained from the *CoolClimate Carbon Footprint Calculator*[6].



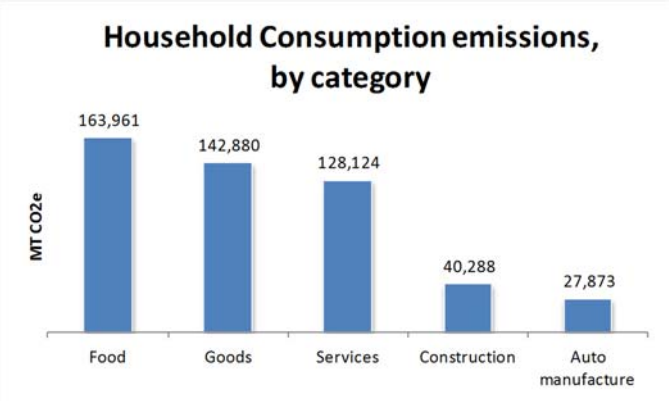
A household carbon footprint can be understood as the greenhouse gas emissions resulting from the production, use and disposal of everything the household consumes in a year, including household energy, transportation, food, goods and services. A household consumption inventory for the entire community is simply the sum of all of the carbon footprints for all households in the community.

Some categories in the calculator were omitted in order to eliminate double counting of emissions. For example, natural gas emissions are already included in Stationary Fuel Combustion. The table below shows which categories were and were not included as Household Consumption emissions sources.

Included in Household Consumption	Not included in Household Consumption
Car manufacturing	Car fuel
Construction	Water
Food	Natural gas
Goods	Electricity
Services	Other fuels
Note: Air travel is included as its own separate category rather than as a part of Household Consumption.	

[6] http://coolclimate.berkeley.edu

When the duplicate categories were eliminated, consumption emissions per household adds up to 21.5 MT CO_2e per year, rather than the 41.8 MT CO_2e generated by the CoolClimate Calculator. This 21.5 MT CO_2e per household was used to calculate the community's total Household Consumption emissions. The chart on the right shows each category's contribution to total Household Consumption.



Emissions estimates for the Government Supply Chain were obtained from the 2008 City of Corvallis Greenhouse Gas Inventory for Municipal Government Operations that used the Local Government Operations Protocol. The City used its purchasing records and the Economic Input-Output Life-Cycle Analysis (EIO-LCA), a public-domain tool developed by Carnegie Mellon University, to estimate the emissions associated with producing the goods and services purchased by the community.

Household and Government Supply Chain Emissions			
507,270 MT CO_2e	**Activity data**		**Method**
	Value	**Unit**	
Household Supply Chain Emissions	21.5	MT CO_2e per household	CoolClimate Carbon Footprint Calculator
Government Supply Chain Emissions	4,144	MT CO_2e	EIO-LCA
Method and data source notes: Household Supply Chain emissions obtained through the CoolClimate Carbon Footprint Calculator. Household unit data from U.S. Census Bureau. Government Supply Chain Emissions calculated for 2008 using EIO-LCA methodology, as reported in the 2008 City of Corvallis Greenhouse Gas Inventory for Municipal Government Operations.			

Conclusion

The goal of this community GHG inventory was to gather and sort greenhouse gas emissions information and present it in a way that is beneficial for future use by the community. The major sources and activities of greenhouse gas emissions have been identified.

This inventory can serve as a source of information for those wishing to pursue climate preparedness activities. It is expected that this will serve as a baseline for additional community greenhouse gas inventories that will be conducted in the future in order to measure change and the impact of any activities undertaken.

Appendix: Community Greenhouse Gas Inventory Details

This table provides a summary of the emissions sources and activities that are included in the community inventory, as well as those potential sources that are excluded.

Emissions Type		Source or Activity?	Included, Required Activities	Included, under reporting frameworks: SI	CA	HC	Other	Excluded (IE, NA, NO, or NE)	Explanatory Notes	Emissions ($MTCO_2e$)
Built Environment										
Use of fuel in residential and commercial stationary combustion equipment		Source AND Activity	X	X					Includes only emissions from natural gas. No data available for other fuels.	172,526
Industrial stationary combustion sources		Source						NO		
Electricity	Power generation in the community	Source						NO		
	Use of electricity by the community	Activity	X	X						341,265
District Heating/ Cooling	District heating/cooling facilities in the community	Source						NO		
	Use of district heating/cooling by the community	Activity						NO		
Industrial process emissions in the community		Source						NO		
Refrigerant leakage in the community		Source						NE		
Transportation and Other Mobile Sources										
On-road Passenger Vehicles	On-road passenger vehicles operating within the community boundary	Source	X	X					Used Oregon DOT's GreenSTEP methodology to calculate VMT.	116,622
	On-road passenger vehicle travel associated with community land uses	Activity						IE		
On-road Freight Vehicles	On-road freight and service vehicles operating within the community boundary	Source		X					Used Oregon DOT's GreenSTEP methodology to calculate VMT.	28,513
	On-road freight and service vehicle travel associated with community land uses	Activity						IE		
On-road transit vehicles operating within the community boundary		Source		X					Calculated emissions using actual transit fuel use.	1,138
Transit Rail	Transit rail vehicles operating within the community boundary	Source						NO		
	Use of transit rail travel by the community	Activity						NE		

Inter-city passenger rail vehicles operating within the community boundary		Source						NO		
Freight rail vehicles operating within the community boundary		Source						NE		
Marine	Marine vessels operating within the community boundary	Source						NO		
	Use of ferries by the community	Activity						NO		
Off-road surface vehicles and other mobile equipment operating within the community boundary		Source						NE		
Use of air travel by the community		Activity				X			CoolClimate calculator	35,603
Solid Waste										
Solid Waste	Operation of solid waste disposal facilities in the community	Source						NO		
	Generation and disposal of solid waste by the community	Activity	X	X						11,924
Water and Wastewater										
Potable Water - Energy Use	Operation of water delivery facilities in the community	Source						IE	Included in Community Electricity use.	
	Use of energy associated with use of potable water by the community	Activity	X					IE	Included in Community Electricity use.	
Use of energy associated with generation of wastewater by the community		Activity	X					IE	Included in Community Electricity use.	
Centralized Wastewater Systems - Process Emissions	Process emissions from operation of wastewater treatment facilities located in the community	Source		X						698
	Process emissions associated with generation of wastewater by the community	Activity						IE	Wastewater treatment facility located within City limits.	
Use of septic systems in the community		Source AND Activity						NE		
Agriculture										
Domesticated animal production		Source						NO		
Manure decomposition and treatment		Source						NO		
Upstream Impacts of Community-Wide Activities										
Upstream impacts of fuels used in stationary applications by the community		Activity								40,927
Upstream and transmission and distribution (T&D) impacts of purchased electricity used by the community		Activity								629
Upstream impacts of fuels used for transportation in trips associated with the community		Activity								
Upstream impacts of fuels used by water and wastewater facilities for water used and wastewater generated within the community boundary		Activity								
Upstream impacts of select materials (concrete, food, paper, carpets, etc.) used by the whole community		Activity								

Independent Consumption-Based Accounting									
Household Consumption (e.g., gas & electricity, transportation, and the purchase of all other food, goods and services by all households in the community)	Activity				X			CoolClimate calculator	503,126
Government Consumption (e.g., gas & electricity, transportation, and the purchase of all other food, goods and services by all governments in the community)	Activity					GC		Emissions data from 2008 organizational greenhouse gas inventory.	4,144
Life cycle emissions of community businesses (e.g., gas & electricity, transportation, and the purchase of all other food, goods and services by all businesses in the community)	Activity						NE		

For details on calculation methods and data sources for each included activity and source, contact the City of Corvallis at (541) 766-6916.