

Gateway Technical College

2009 Greenhouse Gas Inventory
American College and University
President's Climate Commitment

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Executive Summary

The following report contains the 2009 Gateway Technical College Greenhouse Gas Inventory. The report contains explanations of the greenhouse gases, comparisons with other similar colleges, and recommendations for greenhouse gas reduction opportunities.

Throughout the spring of 2010, data was collected for the 2009 fiscal year in order to complete the inventory. Data was collected from a variety of sources including WE Energies for energy data, a survey for commuting data, purchasing cards for air travel data, Waste Management for waste data, and facilities management staff for fertilizer and refrigerant data. The data was then entered into the Clean Air Cool Planet Campus Carbon Calculator. This tool was chosen because it is endorsed by ACUPCC.

In 2009, Gateway Technical College produced approximately 34,900 metric tonnes CO₂e. 69% of the emissions came from travel related sources and 30% of the emissions came from energy use. This is typical of Wisconsin Technical Colleges. Gateway Technical Colleges produced more greenhouse gas emissions than the other Wisconsin Technical Colleges that have completed inventories (Lakeshore, Madison Area, and Western). When the colleges are compared by the amount of building space they operate and the number of students they enroll, Gateway produced similar emissions to the other schools.

Energy conservation efforts and energy efficiency projects could save Gateway Technical College an estimated 2,600 metric tonnes CO₂e or about 8% of the total emissions. Allowing for more online classes and encouraging carpooling could save another estimated 7,000 metric tonnes CO₂e or about 20% of the total emissions.

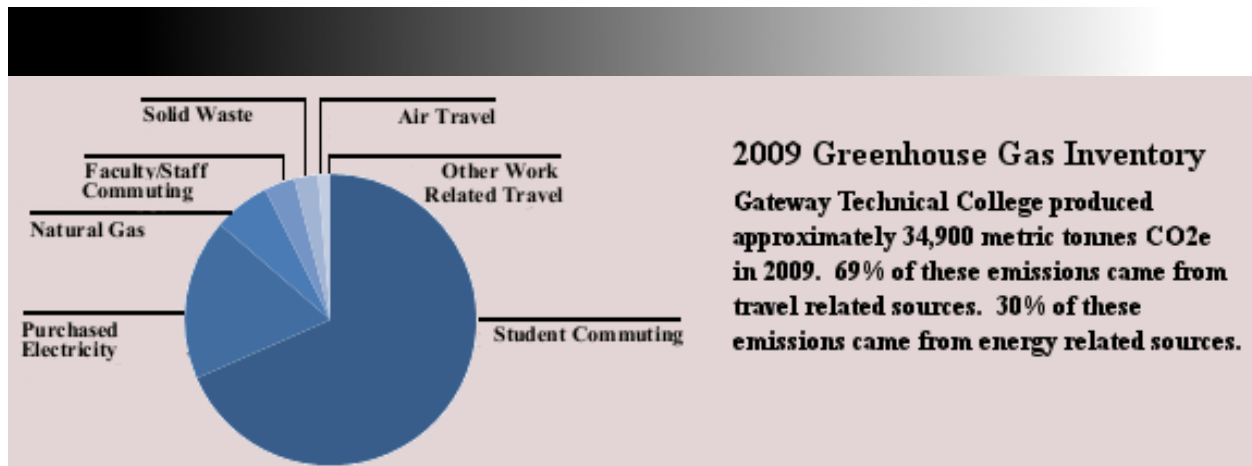


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Introduction

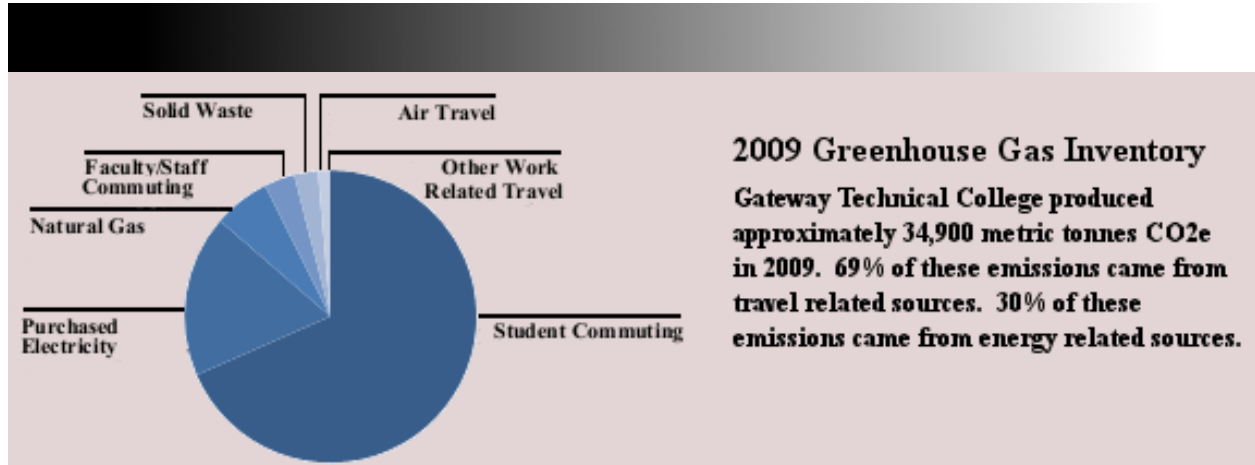
In 2009, Gateway Technical College President Bryan D. Albrecht signed the American College and University Presidents' Climate Commitment (ACUPCC). By doing so, GTC has committed to making a plan to achieve carbon neutrality—emitting zero greenhouse gases. The first step in this process is to quantify the greenhouse gases that GTC is currently emitting. This report details the findings of the GTC greenhouse gas inventory.

Throughout the spring of 2010, data was collected for the 2009 fiscal year in order to complete the inventory. Data was collected from a variety of sources including WE Energies for energy data, a survey for commuting data, purchasing cards for air travel data, Waste Management for waste data, and facilities management staff for fertilizer and refrigerant data. The data was then entered into the Clean Air Cool Planet Campus Carbon Calculator. This tool was chosen because it is endorsed by ACUPCC.

The organizational boundaries of the inventory were determined using the Operational Control Approach meaning greenhouse gases were limited to emissions from operations under the college's control. The inventory includes emissions from the three college campuses—Elkhorn, Kenosha, and Racine—and the college centers associated with GTC.

The amounts of CO₂, CH₄, and NO₂ emissions were calculating. Then the carbon dioxide equivalence (CO₂e) was calculated using global warming potentials (GWP) from the IPCC Third Assessment Report (TAR). GWP is the amount that the greenhouse gas will contribute to global warming compared to the same mass of CO₂. For instance, CH₄ has a GWP of 23. One pound of CH₄ will contribute 23 times as much toward global warming as one pound of CO₂. The term CO₂ equivalent is used to describe the total effect of all the greenhouse gases compared to CO₂. One pound of CH₄ will be equal to 23 CO₂e. Similarly, the GWP for NO₂ is 296. One pound of NO₂ will contribute 296 times as much toward global warming as one pound of CO₂.

Summary of Greenhouse Gas Emissions



Using the Clean Air - Cool Planet Campus Carbon Calculator a wide variety of emissions sources were identified. The largest sources of emissions were from travel where student, faculty, and staff commuting along with air travel combine to generate 69% of the college’s emissions. This was followed by emissions from energy where electricity and natural gas use combine to generate 30% of the college’s emissions. Emissions from solid waste, refrigerants, and fertilizer use were also considered. These emissions represent a very small amount of the total greenhouse gas emissions produced each year.

Specifics on these emissions and comparisons with other Wisconsin Technical Colleges can be found on the subsequent pages of this report.

<i>Student Commuting</i>	<i>22,694</i>	<i>65%</i>
<i>Faculty / Staff Commuting</i>	<i>767</i>	<i>2%</i>
<i>Air Travel</i>	<i>322</i>	<i>1%</i>
<i>Other Work Related Travel</i>	<i>167</i>	<i>0%</i>
Total Travel Related Emissions	23,950	69%
<i>Purchased Electricity</i>	<i>8,359</i>	<i>24%</i>
<i>Natural Gas</i>	<i>2,185</i>	<i>6%</i>
Total Energy Related Emissions	10,544	30%
<i>Solid Waste</i>	<i>412</i>	<i>1.2%</i>

Table 1: Greenhouse Gas Emissions by Source (Emissions in Metric Tonnes CO₂e)

Summary of Greenhouse Gas Emissions

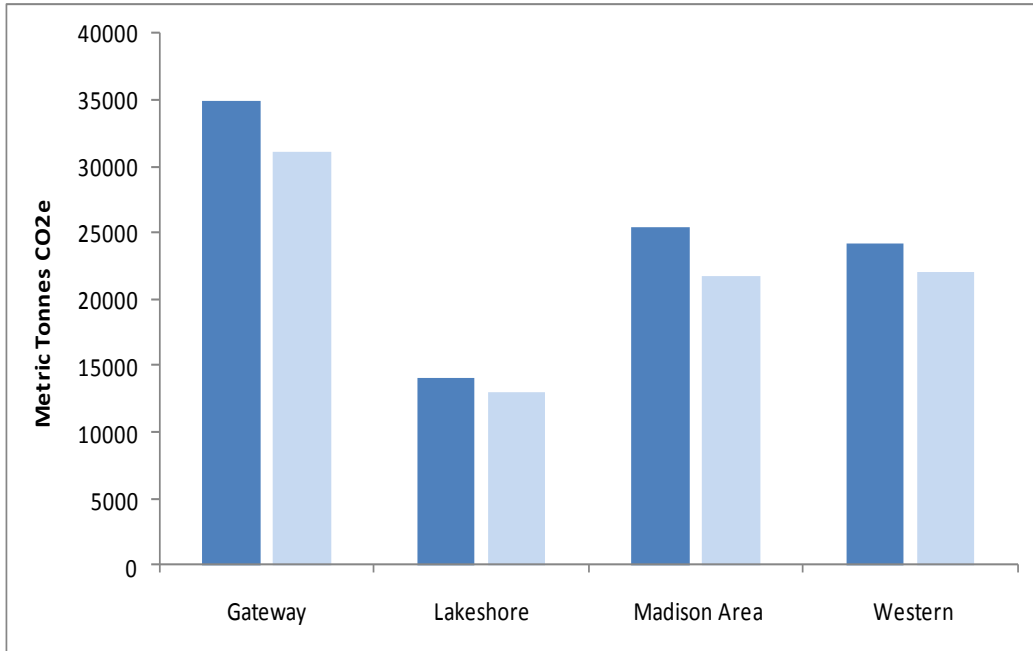


Fig. 1: Greenhouse Gas Emissions at each of the Wisconsin Technical Colleges

The bar on the left represents the emissions for each of the four Wisconsin Technical Colleges that have had greenhouse gas inventories completed. The bar on the right shows the emissions from student commuting and electricity use at each school. These two sources account for at least 85% of the emissions at each school. At Gateway Technical College these two sources account for 89% of the total emissions.

Emissions by Scope

Scopes are important because they describe the amount of control GTC has in reducing emissions. Scope 1 refers to emissions from sources directly owned or operated by GTC. Scope 2 refers to emissions purchased or consumed by GTC. Scope 3 refers to emissions that are not owned by GTC, but are indirectly produced due to GTC's activities.

Scope	Description
Scope 1	Emissions from sources directly owned or operated by GTC.
Scope 2	Emissions purchased or consumed by GTC.
Scope 3	Emissions that are not owned by GTC, but are indirectly produced due to GTC's activities.

Travel Related Emissions

Commuting, air travel, and other work related travel combine to represent 68% of GTC’s total emissions. Student commuting alone represents 65% of GTC’s total emissions. A survey of the commuting habits of GTC students found that 99% of the students drove personal vehicles to campus.

There are three things that could dramatically reduce these emissions. First, make it easier for students to set up carpooling by providing a centralized website that is easy to use. About 25% of students surveyed said they would use a website that would help set up carpools. Second, allow for more distance based learning. Over half of the students surveyed said they would most likely use an online option for class with over one third saying they would definitely use an online option for class. 10% of students surveyed had a commute longer than 30 minutes each way. Online classes could be a huge time saver for students with long commutes. Last, set up a commuter shuttle. 20% of students surveyed said they would use a bus or shuttle service as long as it didn’t add more than 15 minutes to their commute.

Methods:

Commuting
Emissions were found by collecting survey data for the average number of trips taken each day and the length of an average round trip. Data was collected for 119 students and 306 faculty and staff. Data was then extrapolated to represent the total student population and the total faculty and staff population.

Air Travel
Emissions were found using travel data from purchasing records to find distances between airports. The CA-CP calculator then calculated the emissions from the number of air miles traveled.

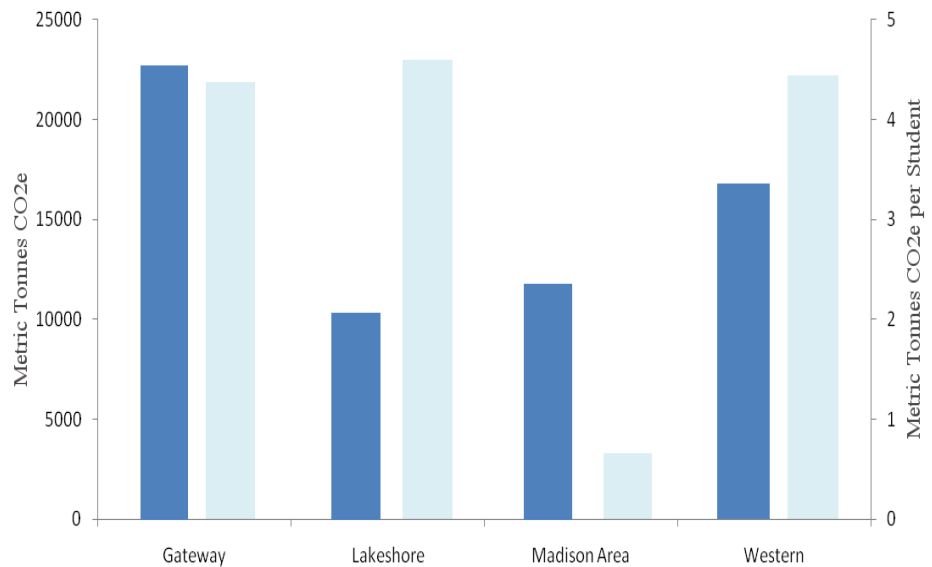


Fig. 2: Commuting Emissions at Wisconsin Technical Colleges.

The dark bar on the left shows the total travel related greenhouse gas emissions. The light bar on the right show the travel related greenhouse gas emissions per student (see Y-axis on right side).

The average student has a roundtrip of 22 miles and makes 3.5 trips per week.

Commuting data was found based on the number of round trips made each week and the length of each round trip.

Assumptions:

16 commuting weeks in the fall and spring semester

8 commuting weeks in the summer.

Approximately 60% of students take summer classes

Energy Related Emissions

The second largest source of GTC’s greenhouse gas emissions are from energy use. Purchased electricity accounts for 24% of the total emissions and natural gas accounts for 6%.

Energy is also one of the most easily reduced sources of greenhouse gas emissions. GTC already gets some of its electricity through WE Energies’ Energy for Tomorrow program, which provides energy from 100% renewable sources. GTC has also recently built a wind turbine to produce energy for its campuses. This should further reduce greenhouse gas emissions in future inventories.

Further energy reduction could come from energy conservation efforts. Turning off lights and computers can save a lot of energy over the course of a year. Also, energy efficiency projects such as HVAC improvements, lighting improvements, lighting scheduling, and building efficiency improvements can save energy and money.

These types of projects can also provide valuable learning experiences for students.

Methods:

Electricity

Data was collected from WE Energies energy data. Data was then entered into the CA-CP calculator. The MROE eGRID region emissions factor was used as the emissions factor for electricity.

Natural Gas

Data was collected from WE Energies energy data. The emissions factor for natural gas was the default natural gas emissions factor in the CA-CP calculator.

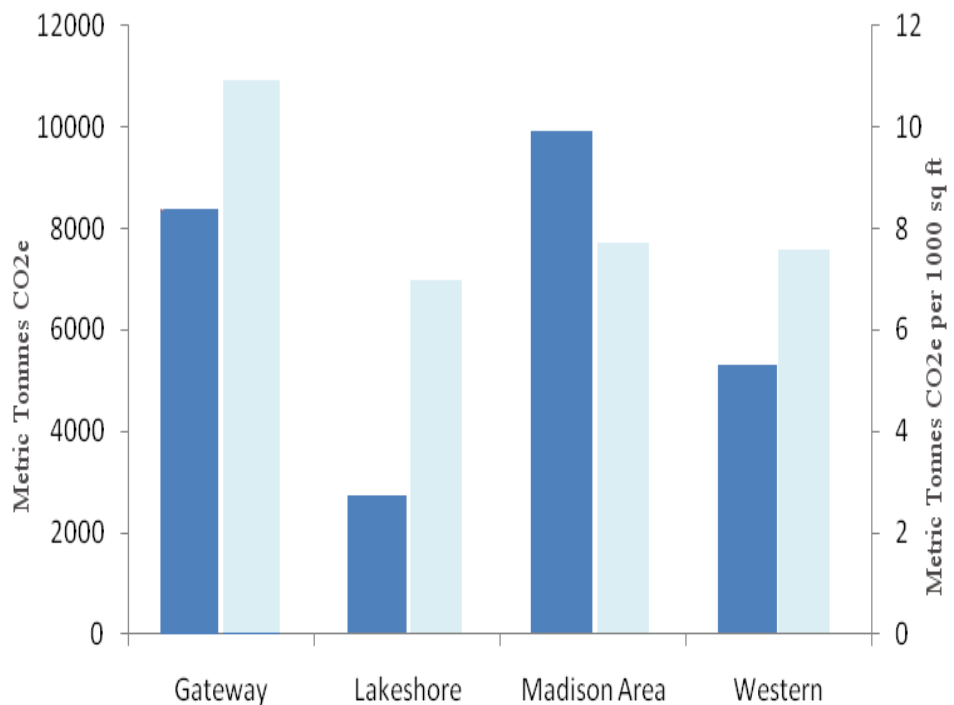


Fig. 3: Electricity emissions at the Wisconsin Technical Colleges

The bar on the left represents the greenhouse gas emissions from electricity use at each of the Wisconsin Technical Colleges. The bar on the right represents the electricity emissions per 1000 sq. ft. of building space (see Y-axis on right side). This is an area where Gateway Technical College could improve. The other three schools produce about 7.5 metric tonnes CO2e per 1000 sq. ft while Gateway produces almost 11 metric tonnes CO2e per 1000 sq. ft. Gateway could have substantial energy savings by incorporating energy saving techniques that other Wisconsin Technical Colleges use.

Other Emissions

Only 1-2% of GTC's emissions come from sources other than travel and energy. Other sources considered include waste, agriculture, and refrigerants.

When waste is degrading in a landfill methane is produced. The Clean Air Cool Planet Campus Carbon Calculator estimates the amount of methane produced. Waste accounts for 1.2% of GTC's greenhouse gas emissions.

Agriculture and refrigerant data was limited. For this report, both sources will be considered "*de minimis*" meaning that they contribute less than 5% of the total emissions. ACUPCC considers these emissions negligible and appropriate not to calculate. Facilities managers have been notified that this data is important and it will be included in future reports.

Emission Reduction Opportunities

There are many opportunities for GTC to reduce greenhouse gas emissions. As described in the travel sources section of this report, emissions from commuting represent the biggest opportunity for reduction. The majority of students surveyed feel that their commute could be lessened in some way. Substantial emissions reductions could be made by offering more online classes and by promoting carpooling.

Below is a wedge analysis of potential ways to reduce greenhouse gas emissions by more than 25%. The top light blue wedge shows reductions from carpooling. This assumes that 15% of students would pair up and drive to school together if they had the option. 20% of students said they would use a free online tool to find people willing to carpool near them.

The dark blue wedge shows the emissions reductions from offering more online classes. This assumes that online classes would eliminate the need for 25% of commuting. 55% of students surveyed said they would like more online options for commuting.

The red wedge shows emissions reductions from energy conservation. This assumes that energy conservation efforts would save 5% of electricity use.

The green wedge shows emissions reductions from energy efficiency improvements. This assumes a 20% electricity savings. Possible projects to consider include lighting upgrades, HVAC improvements, and building commissioning.

The purple wedge represents the remaining greenhouse gas emissions. Under this scenario, greenhouse gas emissions would go from 34,900 to 25,300, a 27% reduction. This is a good intermediate goal (goal by 2015 or 2020). A more detailed plan should be made to establish projects for further greenhouse gas reductions and to identify which projects are most cost effective to implement.

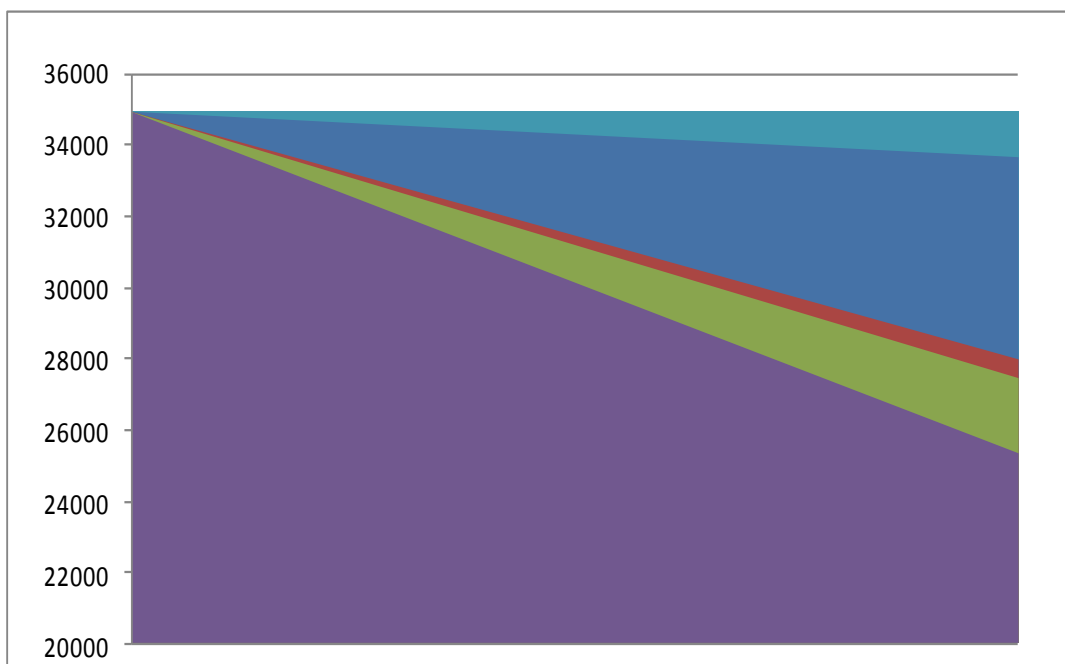


Fig. 4: Wedge Analysis of Greenhouse Gas Emissions Reduction Potential

Appendix A

Snapshot of the CA-CP Calculator

Select Year -->	2009	Energy Consumption	CO ₂	CH ₄	N ₂ O	eCO ₂
		MMBtu	kg	kg	kg	Metric Tonnes
Scope 1	Co-gen Electricity	-	-	-	-	-
	Co-gen Steam	-	-	-	-	-
	Other On-Campus Stationary	41,300.0	2,178,812.1	217.9	4.4	2,185.1
	Direct Transportation	-	-	-	-	-
	Refrigerants & Chemicals	-	-	-	-	-
	Agriculture	-	-	-	0.5	0.1
Scope 2	Purchased Electricity	96,535.7	8,322,149.9	62.6	117.9	8,358.5
	Purchased Steam / Chilled Water	-	-	-	-	-
Scope 3	Faculty / Staff Commuting	10,675.0	748,534.0	149.7	51.5	767.2
	Student Commuting	315,754.1	22,140,846.9	4,428.8	1,524.4	22,693.9
	Directly Financed Air Travel	1,635.1	321,031.4	3.2	3.6	322.2
	Other Directly Financed Travel	2,326.0	163,101.6	32.6	11.2	167.2
	Study Abroad Air Travel	-	-	-	-	-
	Solid Waste	-	-	17,914.3	-	412.0
	Wastewater	-	-	-	-	-
	Paper	-	-	-	-	-
	Scope 2 T&D Losses					
	Offsets	Additional				
	Non-Additional					-
Totals	Scope 1	41,300.0	2,178,812.1	217.9	4.8	2,185.2
	Scope 2	96,535.7	8,322,149.9	62.6	117.9	8,358.5
	Scope 3	330,390.2	23,373,513.8	22,528.6	1,590.8	24,362.5
	All Scopes	468,225.9	33,874,475.9	22,809.1	1,713.5	34,906.3
	All Offsets					-