

**School District #44 - North Vancouver**  
**2013 Carbon Neutral Action Report (CNAR)**  
**May 31, 2013**



## **Overview**

This is the 2013 Carbon Neutral Action Report for School District #44 – North Vancouver (NVSD/SD44). This report contains our 2013 emissions profile, offsets purchased, the actions we have taken in 2013 to reduce our GHG emissions and our plans to continue reducing emissions in 2014 and beyond. By June 30, NVSD's final CNAR will be posted to our website at [www.nvsg44.bc.ca](http://www.nvsg44.bc.ca).

The North Vancouver School District provides a rich diversity of instruction and programs to inspire success for every student bringing North Vancouver communities together to learn, share, and grow. Our mandate is achieved by the passion of our students and teachers, and by working on the many pillars foundational to the School District's vision, one of which is sustainability.

To further engrain our commitment to sustainability and carbon neutrality, in March 2011, the Board adopted a sustainability policy (*Policy 613*) which outlines that the school district will “*reduce its environmental footprint*”, and the Board will “*integrate economic, environmental, and social considerations into its decision-making.*”

Staying true to the North Vancouver School District motto, ‘The Natural Place to Learn’, the NVSD has been conserving energy and reducing greenhouse gas emissions over the past decade. From winning the BC Hydro Power Smart Partner Excellence award in 2003 to our Energy Conservation Initiative Project in 2005, and with lighting retrofits, mechanical and controls upgrades we have set the groundwork for sustainable reductions in environmental impacts from our educational facilities.

In 2009, NVSD engaged an Energy Manager and created a Strategic Energy Management Plan, outlining the goals, benchmarks, and methods to achieve reductions in energy usage and greenhouse gas emissions related to building operations. The specific goals outline an energy intensity reduction of 13% (14,926 eGJ based on the current area) by June 2016 from 2009/2010 levels. These savings will be made up of approximately 18% reduction in electrical intensity (1,864,275 kWh) and a 10% reduction in fuel intensity (7,753 GJ). For emissions, this is equivalent to 13% or 509 tCO<sub>2</sub>e.

In 2010, we celebrated the 40th anniversary of the North Vancouver Outdoor School (Cheakamus Center) near Squamish, and in 2012 we opened the new Environmental Learning Centre at the Outdoor School, expanding our environmental sustainability education. This new and unique facility will support our social sustainability goals by promoting eco awareness to students across the lower mainland for years to come.

In more recent years, our focus has been on the completion of LEED targeted Gold buildings, including the School District's new Educational Service Center, Carson Graham Secondary School, Queen Mary

Elementary School, and Ridgeway Elementary School. Our ambitious capital replacement program has targeted the replacement of facilities at the end of their life cycle, with new or remodelled facilities constructed with energy efficient mechanical systems and high performance building envelope assemblies.

Proposed changes to our facilities, equipment, and operating procedures are usually evaluated on the basis of their remaining life span as well as their “green” value. However, our pursuit of sustainable building and maintenance practices has also benefited the School District with a reduction in our operating costs. With an eye to the future, our sustainability objectives continue to inspire us to be creative with our limited resources.

### **Actions Taken to Reduce Greenhouse Gas Emissions in 2013**

Initiatives undertaken by NVSD in 2013 to reduce energy consumption and carbon footprint include:

- Building control studies were undertaken at all NVSD facilities resulting in optimized energy efficiency;
- Boiler system replacements were implemented at three schools (Brooksbank, Cove Cliff, Sherwood Park) resulting in decreased greenhouse gases;
- HVAC system at Lynn Valley was upgraded and is now more energy efficient;
- Behaviour-change program was implemented to encourage energy conservation behaviour among students and teachers;
- Queen Mary Elementary, our newest renovated school, was constructed to LEED Gold standards;
- Existing large passenger vehicle was replaced with a fuel efficient diesel bus; and
- Paper usage was significantly reduced, and the procurement of paper with high recycled content was introduced.

### **Operational Changes in 2013**

In 2013, operational changes in support of sustainability and GHG reductions included:

- Reviewing DDC control setpoints and identifying opportunities for all elementary schools.
- Implementing equipment upgrades and operational changes in response to the findings of the Continuous Optimization Program currently in progress at 4 of our secondary schools (Handsworth, Seycove, Sutherland, Windsor). The program, undertaken in co-operation with BC Hydro, benchmarked utility consumption over a 9 month period in order to identify the most effective opportunities for re-commissioning.
- Renewing the contract with our Energy Manager with BC Hydro support. The Strategic Energy Management Plan developed by the Energy Manager was updated and it will further develop a culture of energy efficiency and sustainability within our organization and provide direction for future programs and projects to reduce energy consumption.

### Plans to Continue Reducing Greenhouse Gas Emissions 2014-15

- Continue district-wide review of our DDC Mechanical control system to identify energy saving opportunities by adjusting mechanical system operation schedules and sequences.
- Update the boiler plant at Larson Elementary with CNCP funding.
- Upgrades from high-intensity discharge lighting at 8 sites to LED technology (Canyon Heights Handsworth, Larson, Ross Road, Seycove, Sutherland, Westview, Windsor).
- Upgrades to the lighting controls at 6 High Schools (Argyle, Carson Graham, Handsworth, Seycove, Sutherland, Windsor).
- Initiate an engineering review of the North Vancouver outdoor school. Our utility consumption monitoring program, PUMA, has identified above average utility consumption at this school.

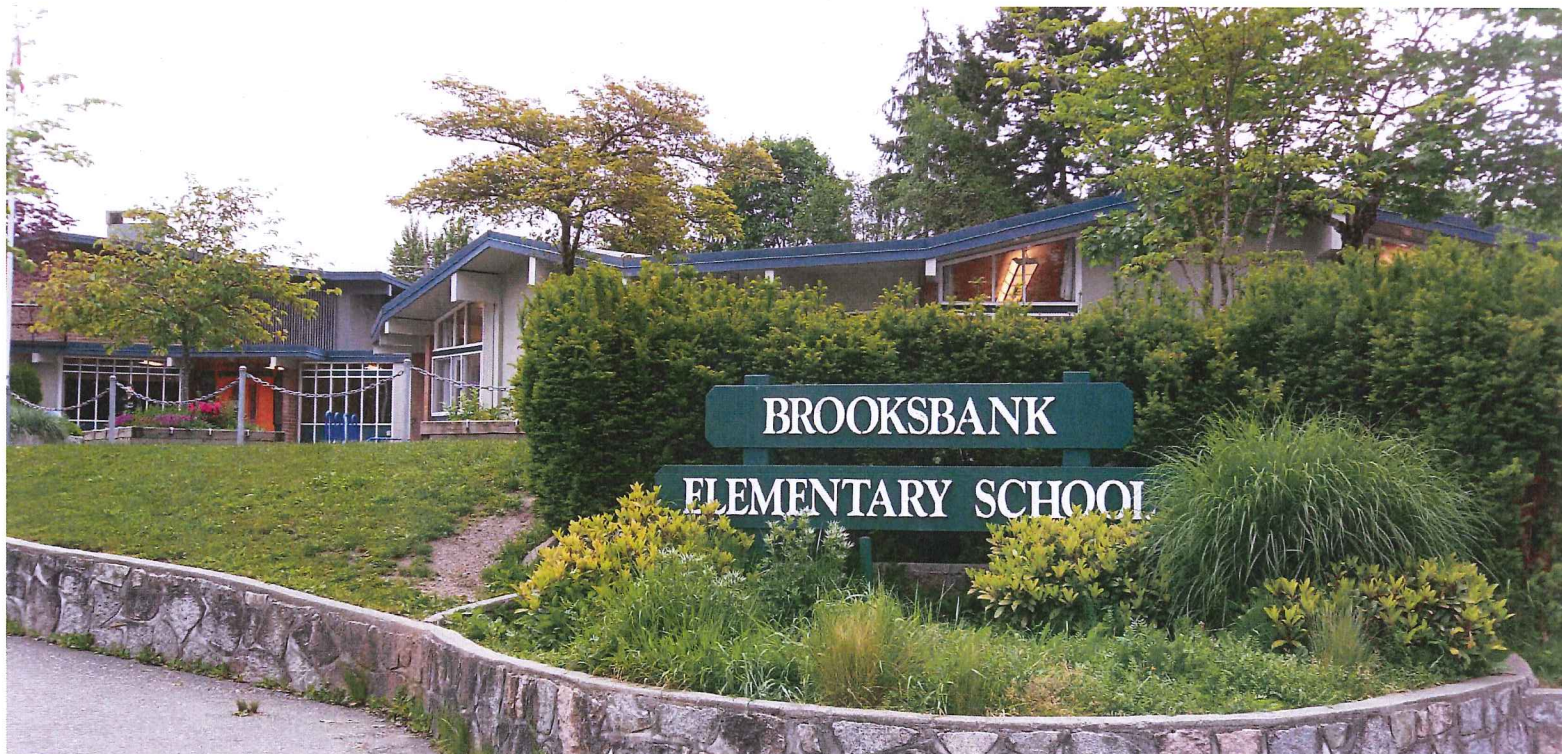
### Emissions and Offsets Summary

School District #44 - North Vancouver	
GHG Emissions created in calendar year 2013	
Total Emissions	4,404 tCO <sub>2</sub> e
Total Emissions for Offsets	4,320 tCO <sub>2</sub> e
Adjustments to GHG Emissions Reported in Previous Years	
Total Emissions	32 tCO <sub>2</sub> e
Total Emissions for Offsets	32 tCO <sub>2</sub> e
Credit owing from PCT at end of 2012 reporting year (if applicable- from May 15 <sup>th</sup> invoice)	
Credit owing	-
Total Emissions for Offsets for the 2013 Reporting Year (from Offset Invoice):	4,352 tCO <sub>2</sub> e

  
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Janson Ho  
Director, Facility and Planning  
North Vancouver School District #44

*Resubmitted Jun. 6/14*  
\_\_\_\_\_  
Date





# North Vancouver School District Brooksbank Boiler Upgrade 2013



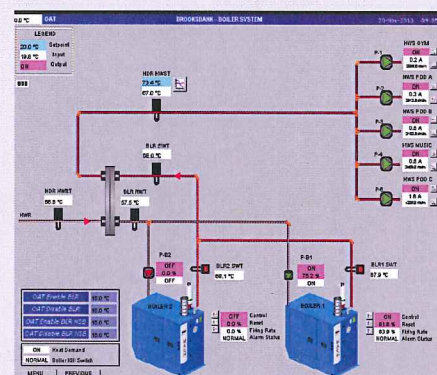
Compared to other elementary and high schools in North Vancouver, Brooksbank Elementary was one of the highest fuel-using schools based on area. North Vancouver School District (SD#44) decided to upgrade the boiler plant, and use this opportunity to reduce future carbon emissions by optimizing the heating system for the school.

## Upgrades as opportunities for energy efficiency

Upon the initial review in the fall of 2012, clear issues with the boiler plant operations were observed, including the system controls, the equipment condition, and the undersized heating capacity. Working with Prism Engineering, the team expedited design and construction in order to capitalize on funding opportunities available through the Carbon Neutral Capital Program. Meeting the funding deadlines required a plant upgrade in the midst of the heating season, requiring detailed construction coordination using a phased approach.

### Technical details:

- » A low loss header was installed to ensure independence between the primary and secondary loops of the heating system.
- » Matching the variable flow rates between both loops effectively eliminates mixing between the supply and return, which optimizes the potential for condensing in the variable-flow, low-mass boiler system.
- » The latest technologies were used in the upgrade including condensing boilers and Electronically Commutated Motor (ECM) pumps.

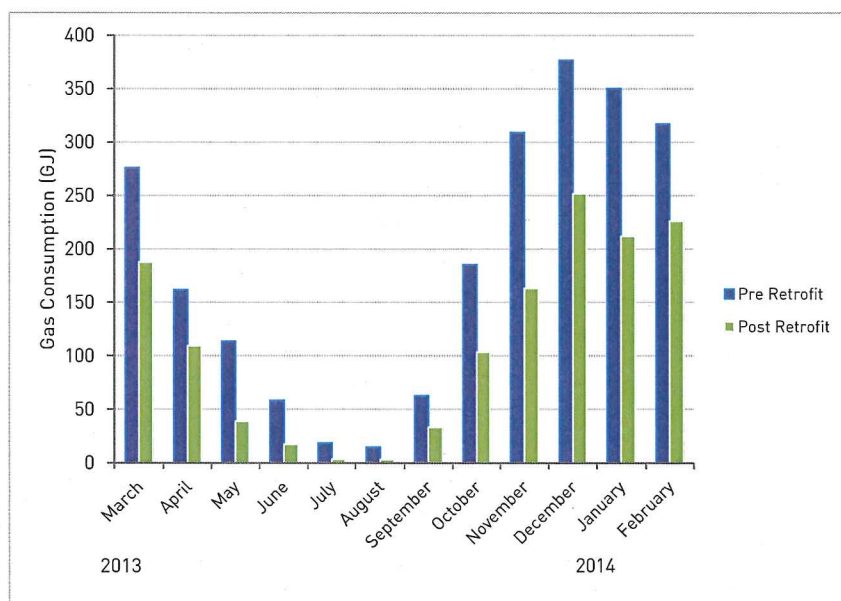




An upgrade to the building's DDC controls allowed for heating demand feedback from each system zone. The critical zones within the school are identified and the system flow and temperature are reset based on the building heating demand. This control strategy drives the supply and return water temperature as low as possible, increasing the condensing boiler efficiency.

## It's all in the numbers

The boiler upgrade concluded in February 2013, and the savings were immediately apparent. The chart shows the pre-retrofit monthly usage (adjusted for weather) (blue bars), where the annual consumption totals 2,244 GJ/year, while the post-retrofit monthly usage (green bars) drops to a total of 1,348 GJ/year—leading to an annual natural gas savings of 896 GJ or 40%. This project also significantly contributes to NVSD's reduction in carbon emissions.



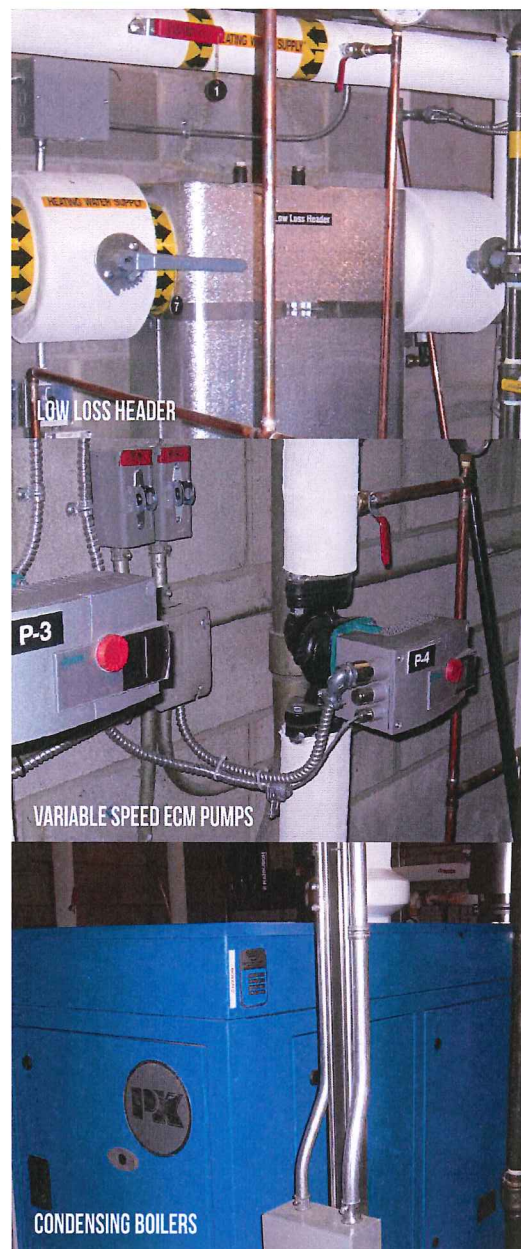
**40% NATURAL GAS SAVINGS** | **45 TONNES OF EQUIVALENT CO<sub>2</sub>** | **\$9K SAVINGS ANNUALLY**

On an annual basis, this boiler upgrade will save an estimated 45 tonnes of eCO<sub>2</sub>, equivalent to \$1,117 in BC carbon charges<sup>1</sup>. In terms of energy cost savings, this project will reduce natural gas payments by approximately \$9,300 annually<sup>2</sup>.

Not only has the boiler upgrade led to significant energy savings, the operational issues initially observed are no longer a concern, and occupant heating complaints have been greatly reduced.

<sup>1</sup> at \$25 per tonne

<sup>2</sup> based on an average of monthly prices from Oct 2013-Feb 2014



## Partnerships

The boiler upgrade at Brooksbank Elementary was assisted by the funding provided by the Carbon Neutral Capital Program and Fortis' Efficient Boiler Program.

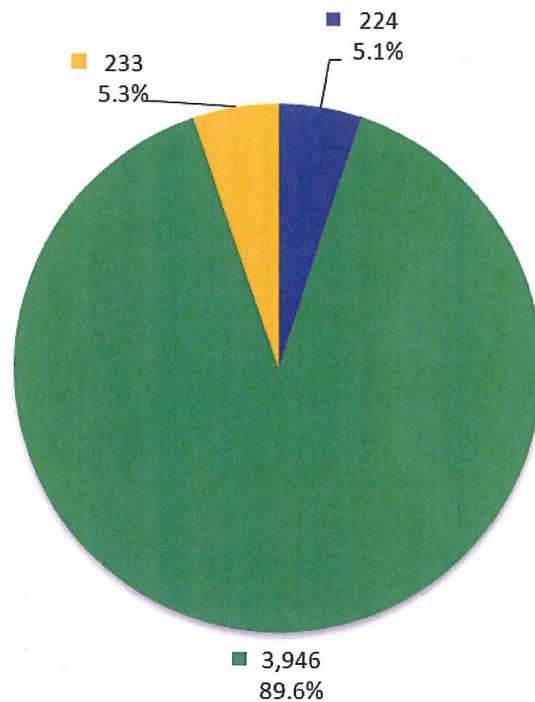


Savings calculations & case study prepared by



saving you energy

**School District 44 - North Vancouver  
Greenhouse Gas Emissions by Source  
for the 2013 Calendar Year (tCO<sub>2</sub>e\*)**



**Total Emissions: 4,404**

- Mobile Fuel Combustion (Fleet and other mobile equipment)
- Stationary Fuel Combustion (Building Heating and Generators) and Electricity
- Supplies (Paper)

**Offsets Applied to Become Carbon Neutral in 2013 (Generated May 13, 2014 12:03 PM)**

Total offsets required: 4,320. Total offset investment: \$108,000. Emissions which do not require offsets:

\*Tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e) is a standard unit of measure in which all types of greenhouse gases are expressed based on their global warming potential relative to carbon dioxide.

\*\* Under the *Carbon Neutral Government Regulation of the Greenhouse Gas Reduction Targets Act*, all emissions

**School District 44 - North Vancouver**  
**Greenhouse Gas Emissions Source Detail Report for the 2013 Calendar Year**  
Generated May 13, 2014

Source		Quantity		Greenhouse Gases In Tonnes			
				CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	tCO <sub>2</sub> e *
Stationary Fuel Combustion (Building Heating and Generators) and Electricity							
Offset Required	Fuel Combustion **	72,257.21	GJ	3,605.69	0.07	0.07	3,628.99
	Purchased Energy	42,087.77	GJ	316.43	0.00	0.00	317.43
	Offset Required Sub Total			3,922.12	0.08	0.07	3,946.41
Offset Exempt	CO <sub>2</sub> from Biogenic Fuel Combustion			0.02	N/A	N/A	0.02
	Offset Exempt Sub Total			0.02	0.00	0.00	0.02
	TOTAL STATIONARY EMISSIONS			3,922.14	0.08	0.07	3,946
Supplies (Paper)							
Offset Required	Non-recycled Content Paper	28,797	Pkg	187.90	0.00	0.00	187.90
	Recycled Content Copy Paper	7,804	Pkg	45.41	0.00	0.00	45.41
	Offset Required Sub Total			233.31	0.00	0.00	233.31
TOTAL SUPPLIES EMISSIONS				233.31	0.00	0.00	233
Mobile Fuel Combustion (Fleet and other mobile equipment)							
Offset Required	Fuel Combustion **	57,476.45	L	132.99	0.01	0.02	139.96
	Offset Required Sub Total			132.99	0.01	0.02	139.96

<b>Offset Exempt</b>	School Bus	29,989.40	L	74.76	0.00	0.00	76.31
	CO <sub>2</sub> from Biogenic Fuel Combustion			7.60	N/A	N/A	7.60
	<b>Offset Exempt Sub Total</b>			82.37	0.00	0.00	83.91
	<b>TOTAL MOBILE EMISSIONS</b>			215.36	0.01	0.03	224
<hr/>							
	<b>Total Offset Exempt</b>			82.39	0.00	0.00	84
	<b>Total Offset Required</b>			4,288.43	0.09	0.10	4,320
	<b>TOTAL EMISSIONS</b>			4,370.81	0.09	0.10	4,404

\* Each greenhouse gas has been converted to a standard measurement (tCO<sub>2</sub>e) by multiplying its emissions by its global warming potential (GWP).

The GWP of carbon dioxide (CO<sub>2</sub>) from both anthropogenic and biogenic sources is 1; methane (CH<sub>4</sub>) is 21, and nitrous oxide (N<sub>2</sub>O) is 310.

The Totals for tCO<sub>2</sub>e are shown here rounded to the nearest whole metric tonne as only whole tonnes of tCO<sub>2</sub>e can be purchased for offsets.

\*\* Includes Fossil Fuels and CH<sub>4</sub> and N<sub>2</sub>O from Biogenic Fuels



# 2013 Carbon Neutral Action Report (CNAR) - Part 2 ACTIONS

Created Friday, February 07, 2014

Updated Friday, June 06, 2014

<https://fluidsurveys.com/surveys/cas-z/2013-cnar-form-bps-actions/3df3818883dc7971e6f05ad1e067f2e9/>

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## Page 1

Please complete the following sections of the 2013 Carbon Neutral Action Report form. Save your work frequently to prevent it from being lost. You can also save a copy for your own use as either a WORD or PDF file using the buttons at the bottom of each page.

This is Part 2 of the Carbon Neutral Action Report form. This section reports on actions taken to reduce emissions during the 2013 calendar year. This information will be included in your final Carbon Neutral Action Report posted on the Ministry of Environment website.

When the form is complete press the submit button on the last page to automatically submit the information to the Climate Action Secretariat (CAS). Do not press submit before you are ready – this may result in a loss of work.

In addition to completing this survey (Part 1 2), you are required to submit your completed Overview (Executive Summary) and Self-Certification Checklist. The 2013 Overview template was included in the email sent and can also be found on the LiveSmart leaders Community.

Please ensure you meet the following reporting deadlines:

A DRAFT 2013 CNAR is due to CAS by March 31, 2014. The draft is comprised of the Overview ONLY (no executive sign-off required).

The FINAL 2013 CNAR is due to CAS by May 30, 2014. The final 2013 CNAR includes Part 1 Part 2 survey form and Overview.

The Self-Certification Checklist is due to CAS by May 15, 2014.

For more information about the Carbon Neutral Government process, please refer to *Becoming Carbon Neutral 2013*, or should you have any questions please contact [climateactionsecretariat@gov.bc.ca](mailto:climateactionsecretariat@gov.bc.ca).

Organization Name

*North Vancouver School District (SD#44)*

**Actions Taken to Reduce Emissions**

1) Stationary Fuel Combustion, Electricity (Buildings):

Indicate which actions were taken in 2013:

Performed energy retrofits on existing buildings

*Yes*

Built or are building new LEED Gold or other "Green" buildings.

*Yes*

Undertook an evaluation of overall building energy use.

*Yes*

Please list any other actions taken to reduce emissions from Buildings:

*controls optimization at all locations, boiler retrofits in two schools, behavior based programs for students and teachers*

2) Mobile Fleet Combustion (Fleet and other vehicles):

Indicate which actions were taken in 2013:

Do you have a fleet?

*Yes*

Replaced existing vehicles with more fuel efficient vehicles (gas/diesel)

*Yes*

Replaced existing vehicles with hybrid or electric vehicles



No

Reduced the overall number of fleet vehicles

No

Took steps to drive less than last year

No

Please list any other actions taken to reduce emission from fleet:

*Replaced a bus with a more efficient diesel bus*

3) Supplies (Paper):

Indicate which actions were taken in 2013:

Used less paper than previous year

Yes

Used only 100% recycled paper

No

Used some recycled paper

Yes

Used alternate source paper (Bamboo, hemp, etc.)

No

Please list any other actions taken to reduce emissions from paper use:

*Encourage use of double sided printing by setting defaults (IT) for all printer set up.  
Scanning more and using pdf in lieu of copying.*

Actions Taken to Reduce Emissions - continued

Explain how you plan to continue minimizing emissions in 2014 and future years:

*Energy upgrades and optimization funded through AFG and CNCP funding.*

*Purchase more efficient vehicles and buses upon replacement.*

*Look for opportunities through a continuous improvement approach to energy management.*

If you wish to list any other "sustainability actions" outside of buildings, fleet, paper and travel check "yes". This reporting is optional.

*No*