

An aerial photograph of a river valley. The river flows through the center, surrounded by agricultural fields in various shades of green and brown. A city grid is visible on the left side. The top and bottom of the image are framed by a solid green border.

Carbon Neutral Action Plan 2013

 Delta School District
Inspired Learning

Executive Summary

The Delta School District has taken a proactive role in environmental stewardship for many years. The Board, District Administration, Principals, teaching and support personnel, and students have strived for a sustainable learning community. The Delta School District has focused on resource conservation when operating; protect the environment when selecting materials going into our schools; education programs to promote awareness around sustainability and climate change.

Like many school districts, Delta has been replacing inefficient equipment with new, more efficient technology. The challenge Delta faces is that the projects available are becoming more capital intensive and the return on investment is lower. This is due to many of the “low hanging fruit” projects have already been completed within the District.

In the year of 2013, the Delta School District:

- Began the recommissioning process for the building automation system to optimize operation and reduce waste
- Replaced domestic hot water boilers with higher efficiency units
- Upgraded space heating plants with condensing boilers and geo-exchange systems
- Upgraded exterior lighting with LED and induction fixtures
- Upgraded the control of lights and heating units by adding occupancy sensors
- Replaced classroom light fixtures that use half the power of the original and outputs the same amount of light
- Supported schools in their own sustainability projects through funding and other resources with the maintenance team

For the year of 2013, the District’s carbon footprint was 3,344 tCO₂e. With the help of all stakeholders including, students, teachers, administration and facilities maintenance, we were able to reduce our carbon footprint by 10.4% overall from the previous year.

We are pleased to present the following report on our pursuit of becoming carbon neutral.



F.J. (Frank) Geyer, PEng, FMA
Director of Facilities & Planning



G.J. (Garnet) Ayres
Deputy Superintendent of Schools



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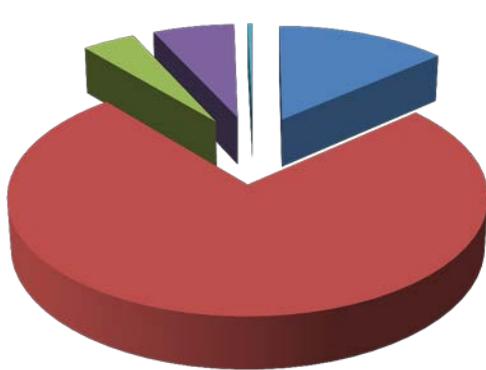


2013 Greenhouse Gas Emissions

For the 2013 calendar year, the Delta School District’s greenhouse gas emissions were **3,344** tonnes of CO₂e. The emissions decreased by approximately 10% from the previous reporting period.

The following chart summarizes the greenhouse gas emission by source.

Delta School District Greenhouse Gas Emissions for 2013



- MOBILE COMBUSTION
- STATIONARY COMBUSTION
- PURCHASED ENERGY
- OFFICE PAPER
- BIOMASS EMISSIONS

Offsets Applied to Become Carbon Neutral in 2013

The total emissions offset applied to become carbon neutral in 2013 as reported in the “Total for Offsets” line in SmartTool is 3,288 tCO₂e. After the adjustment to the 2012 emissions offset of -2 tCO₂e, the net offsets purchased came to 3,286 tCO₂e, costing \$82,150 plus GST.

Out-of-Scope Emissions include refrigerants: R-22 (HCFC), R-401a (HCFC), MP-39 (HCFC). Fugitive emissions were estimated to be 23.4 tCO₂e which is less than 1 percent of the District’s emissions. The value was estimated from the refrigerant recharge amounts of R-134a and R-404a (HFCs) in the year of 2013. The emissions from refrigerants are deemed to be out of scope and have not been included in the total District greenhouse gas emissions profile.

Emission Source	2013 (tCO ₂ e)	2012 (tCO ₂ e)	2011 (tCO ₂ e)	2013 vs. 2012
Buildings				
Electricity	141.8	233.3	243.4	-39%
Natural Gas & Propane	2,520.1	2,871.1	3269.4	-12%
Fleet				
Gasoline, Propane & Diesel	452.4	378.3	367.1	+20%
Biodiesel	13.2	30.6	36.0	-57%
Office Paper	216.4	219.3	167.2	-1%
Total Emissions	3,343.9	3,732.5	4,083.1	-10%

Emissions Reduction Activities

The following is a high-level summary of the activities the Delta School District continued with from previous years, as well as new projects initiated in 2013.

Hardware Projects

**projects continued from the previous year*

Building Automation System Recommissioning*

The Direct Digital Control (DDC) System has been operational within the District for many years. There have been additions, modification and repairs. Recommissioning includes:

- Renaming equipment names and points to a consistent naming convention throughout the District for ease in maintenance call responses
- Ensuring all sensors including temperature sensors, occupancy sensors, etc. are all operational and calibrated
- Incorporating occupancy sensors to reduce outdoor air when room is unoccupied
- Adjusting heat pump/auxiliary gas switchover temperature to maximize efficiency

Heating System Load Shedding Pilot

Sixteen schools are served by rooftop air-to-air heat pumps with auxiliary gas. The District has started a pilot program at one school to implement load shedding (reduce electrical demand) and reduce overall consumption. In order to achieve savings, the units alternate providing heat to reduce instantaneous electrical demand. There are real-time energy meters monitoring electrical demand and historical trend logs are saved. A target maximum demand is determined and the rooftop units alternate heating to minimize simultaneous usage. Occupancy sensors are implemented into each room to close the outdoor air damper when the room is not occupied and the room is placed lower on the priority list to in providing heat. The majority of the heating load for a classroom is from ventilation.

Domestic Hot Water Boiler Heating Plant

The domestic hot water boiler plant was replaced in Delta Secondary. Two high efficiency condensing boilers and two insulated storage tanks were installed to replace the old mid-efficiency boilers and extremely large storage tank. The large storage tank was removed to eliminate heat loss into the mechanical room through the large surface area of the tank. The domestic hot water system serves the washrooms, custodial rooms, staffroom and a full commercial kitchen. The savings for this project is estimated at 201 GJ/year.

Make-up Air Unit Replacement Collaboration Pilot with Fortis

In collaboration with Fortis BC, the District has committed to replacing a commercial kitchen make-up air unit at Delta Secondary with a condensing model (>90% efficiency). The unit provides tempered air when the exhaust fan serving the gas fired kitchen equipment is turned on. The gas consumption and fan operation will be trending and recorded for analysis. The purpose of the pilot is to determine the feasibility of replacing make-up air units with condensing units throughout the District.

Geo-exchange Heating Plants*

Geo-exchange thermal energy systems have been installed at nine District sites to provide hydronic heating throughout the buildings. Sites include elementary schools, secondary schools and administrative buildings that have the highest savings opportunity. These sites are expected to see a total savings of 25,772 GJ per year. The savings will be realized financially in the next heating season.

Rooftop Unit Replacement

Fifty natural gas-fired rooftop units at the secondary school in Tsawwassen have been replaced with air source heat pumps with auxiliary gas. When the outdoor air is greater than 0° Celsius, the units provide heat using the heat pump and when temperatures are less than 0° Celsius, the unit provides heat via natural gas. The savings are estimated to be 5,013 GJ/yr.

Outdoor Parking Lot and Building Exterior Lights*

The District is continually replacing HID (high intensity discharge) HPS (high pressure sodium) area lighting with lower power input induction and LED (light emitting diode) lighting units. The lighting output from the new units is higher than or equal to the original units that had higher power inputs.

Upgraded Lighting Control*

Occupancy sensors have been installed in all classrooms, libraries, offices, hallways, storage rooms and washrooms. The lights were only on when the space is occupied during school operating hours. The installation for all the sites started years ago but was only completed in 2013. Approximately 50% less power is used compared to the original lighting fixtures.

Upgraded Heating Control*

At certain sites, classrooms each have one designated unit ventilator that provides heating and ventilation. The majority of the heat used is for heating outside air for ventilation. Occupancy sensors have been added for closing the outside air damper when the room is not occupied in order to minimize the amount of outside air that needs to be heated. Installation of these sensors in classrooms with terminal units started in 2012 and is continuing into 2014-2015. The sensors were installed in three sites in 2012, three more in 2013 and more are planned for following years. Five of the six sites with occupancy sensors installed still need to be incorporated into the HVAC programming, which will be completed in 2014.

Upgraded to More Efficient Interior Lighting Fixtures*

Existing 2-lamp T8 fixtures were replaced with 1-lamp T8 fixtures that produce equivalent lighting output than the previous. Lamps are the same therefore energy usage is reduced by 50%. Two schools were upgraded in 2012, five in 2013, with more planned in 2014.

Behavioural Conservation Programs

District-Wide Student Green Symposium – Ignite a Spark

In 2013, a group of enthusiastic secondary school students initiated and organized their own District-wide sustainability conference, titled “Ignite a Spark”. The event was scheduled for a province-wide professional development day. In addition to the students within the Delta School District, students from the surrounding school districts also participated in the event.

Below is the description provided on the event website:

“Igniting a Spark is an environmental symposium run by students, for students, to inspire a movement for sustainable change in BC. This conference is open to all students in the Lower Mainland.

Build connections with students from all over BC. Engage in relevant issues impacting us today such as the proposed Northern Gateway Pipeline and Surrey Coal Terminals. Connect with dozens of environmental organizations like Burns Bog Conservation Society and Metro Vancouver (Zero Waste Challenge). Learn the secrets of carrying out a large-scale environmental campaign from 2012 TedXKids presenter, Veronika Bylicki and Maureen Jack LeCroix, co-founder of Be the Change Earth Alliance.

At this conference, you can also share your ongoing sustainability initiatives and collaborate with students from across the Lower Mainland. In addition, many special guests, including local politicians, will be attending the conference, giving you the chance to impact the policies of these influential individuals.”

<http://greensymposium.drupalgardens.com/>



Energy Conservation Grants

An Energy Conservation Grant was available to each school for when they participate in the program. As the activities were geared towards energy conservation, the grant was funded from the utility budget. The program included:

CLIMATE CHANGE – We are Committed to Reducing Our Carbon Footprint



Green Team Members _____

Energy Pledge 2013 /2014

I understand that energy consumption affects our natural environment, human health and well-being.

I pledge to make every effort to support _____'s commitment to energy conservation and to set a good example for the community. I pledge that I will strive to:

- Use lights when necessary
- Turn lights out as I leave rooms empty or in empty rooms I pass, and encourage others to do the same.
- Close windows and doors to prevent the loss of heat.
- Avoid using heating and air-conditioning whenever possible.
- Routinely shut off and unplug electrical devices when they are not in use.
- Turn off, hibernate or put to sleep computers when they are not in use.
- Limit the number of loads of laundry I do and use of the dryer.
- Take the stairs instead of the elevator whenever possible.
- Use water (especially hot water) sparingly.
- Avoid driving personal vehicles whenever possible.
- Encourage my peers to take this pledge and follow these best practices.

Phase 1: Creating a Green Team, committing to the energy conservation pledge (left) and presenting the school's commitment to staff and students. The pledges were posted on the wall near the entrance of the school to declare commitment to conservation to any visitors.

Phase 2: Sweater Days, Energy Audits that lead to Action, Remove all non-District issued (power consuming) equipment, Innovative Activity.

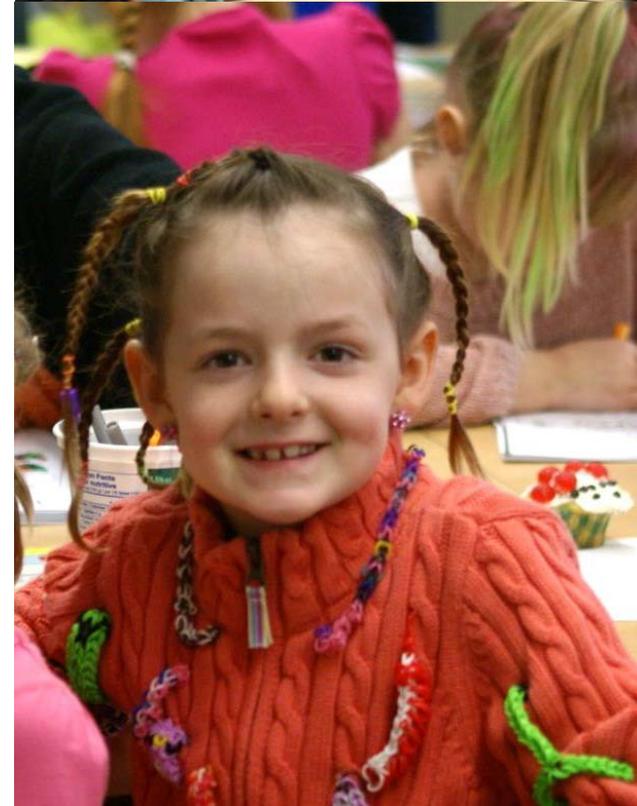
Phase 3: Present the team's activity through the year and submit a plan for the following year.

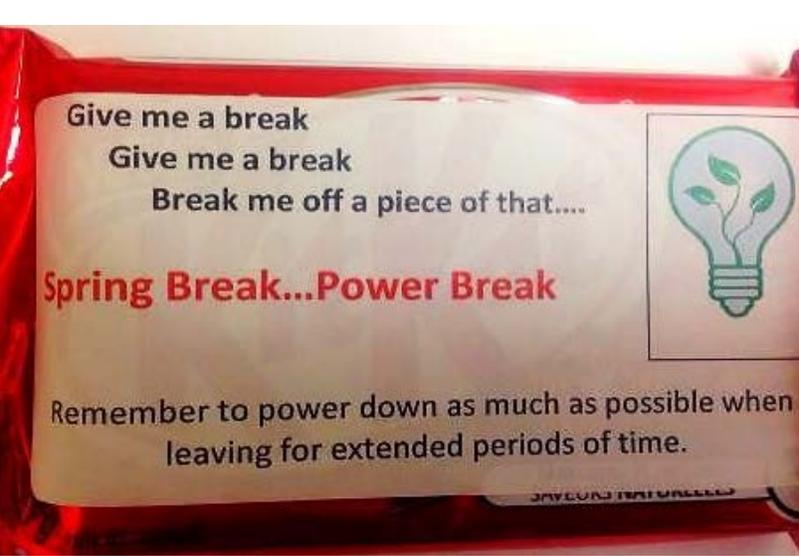
Each activity has been assigned a grant dollar value and the schools were rewarded after photos of the activities were submitted for use in the District blog.

BC Hydro Energy Ambassador Program – Continued from Previous Year

For the school year beginning September 2013, two secondary schools with a total of eight students are participating in the BC Hydro Energy Ambassador program where students take part in an energy workshop that discuss the purpose of energy conservation and share ideas on how to spread the information. The students then compose their own active presentations with games to present to elementary school students to spark an interest to be more energy aware. The energy ambassadors exercise their leadership skills and inspire the elementary school students to share their own ideas on how to reduce energy consumption.

In the previous school year, three secondary schools applied for the energy ambassador grant from BC Hydro and two of the schools were awarded the grant, including Seaquam Secondary and North Delta Secondary.





BC Hydro Workplace Conservation Awareness Program – Continued from Previous Year

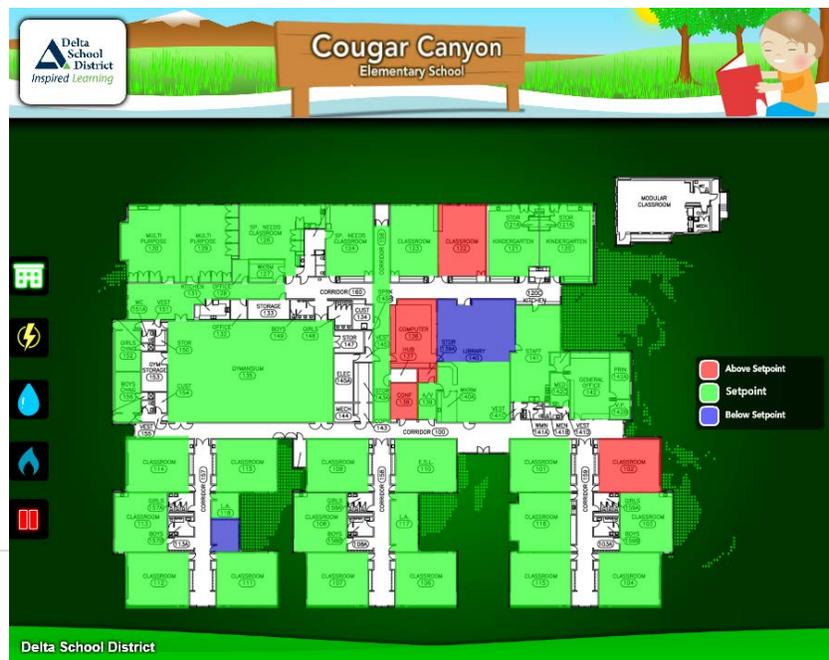
For the school years 2013/2014, the Delta School District participated in a BC Hydro pilot program called the Workplace Conservation Awareness Program (WCA). Nine schools participated in the program. There were two main objectives:

- Create a strong sustainability community within each school
 - Support leadership of energy champions
 - Use existing District intranet as a tool for online collaboration
 - Recognize strategies for sites participating
- Incorporate Plug Load into sustainability consciousness
 - Marketing campaigns
 - Promote energy conservation practices to groups that rent District space
 - Integrate new energy dashboard technology to monitor energy use at each site

The BC Hydro program administrative requirements were completed for the nine sites but the same conservation measures were applied to schools other than the original nine. As mentioned in the previous greenhouse gas emissions summary, the results are positive. For the following year, the District plans to increase the number of participating sites by 2-3.

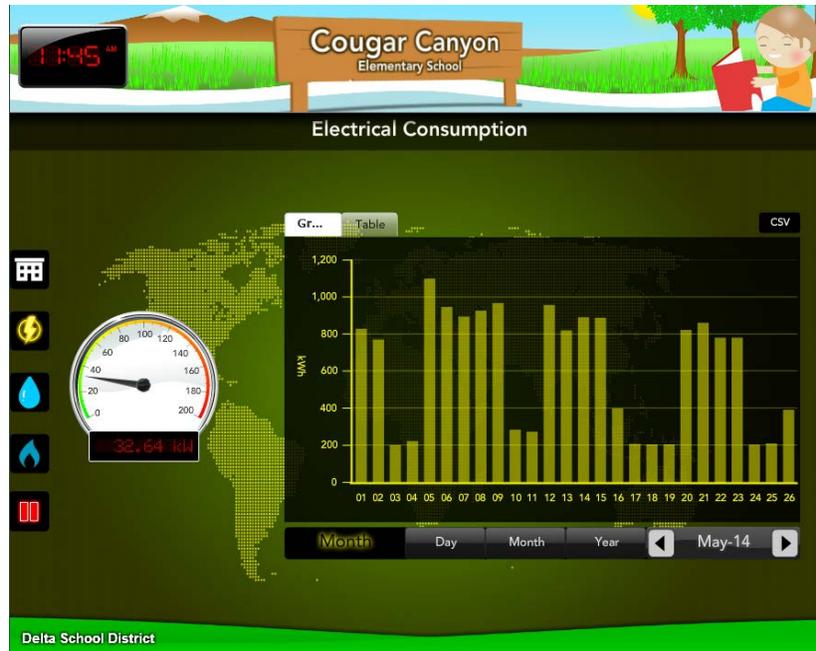
Energy Educational Dashboard – Continued from Previous Year

In 2012, “energy dashboards” were installed in all District sites (schools, board office, resource centre, and maintenance facility) to provide energy usage of the sites to stakeholders. In addition to energy consumption (electricity, water, purchased thermal energy), the energy dashboards have floor plans of the schools with rooms that would be displayed in red, blue or green depending on the room temperature read by the DDC relative to the temperature set-point.



In the spirit of spreading energy conservation awareness across the Delta School District, informational and instructional presentations were given at principals meetings, vice- principal meetings and coordinator meetings. The audience was encouraged to pass the information on to all staff at their sites.

Students currently study various environmental topics and undertake many green initiatives. The energy dashboards will be incorporated into the energy conservation practices already taking place. For example, students can turn off the lights and see an immediate drop in electricity consumption. Staff and students are encouraged to reduce their use of resources by turning off lights when not required, not letting the water tap run when not in use, unplugging equipment when not in use, and reducing photocopying. By introducing the dashboard, it quantifies and visualizes the efforts of staff and students to conserve energy. By illustrating results, it would motivate the staff and students to continue their efforts.



Plans to Continue Reducing Greenhouse Gas Emissions 2014 - 2016

Over the next three years, the Delta School District plans to incorporate the following into the operations of the schools:

Behavioural Projects

Energy Conservation and Climate Change to be Added to Student Curriculum

The District has committed to providing resources to an elementary school librarian and secondary school librarian for producing an educational package that teachers can borrow to teach their class about energy conservation and climate change. The goal is to encourage students to become more aware of the issues regarding climate change and to incorporate conservation into their daily decision making.

Hardwire Projects

North Delta Adult Learning Centre Replacement

The existing Adult Learning Centre in North Delta is going to be relocated from its home at a secondary school to a more central secondary school site in the North Delta community. The facility, re-branded as “Delta Community College”, is a new wood frame building scheduled to be completed by August 2014. This project gives the District an opportunity to implement green initiatives when constructing the facility, such as:

- Installing energy efficient exterior envelope (walls, roofs and windows) to reduce heat loss
- Increasing the amount of natural daylight into interior spaces through larger windows and skylights
- Installing low flow water fixtures
- Installing efficient lighting fixtures with occupancy sensors
- Installing high efficiency air source heat pumps
- Implementing demand control heating/ventilation



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

Created Monday, February 24, 2014

Updated Friday, March 28, 2014

<https://fluidsurveys.com/surveys/cas-z/2013-cnar-form-bps-actions/35075110b55a028c148593b3c6bfb732/>

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.

Organization Name

Delta School District

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.

No

Undertook an evaluation of overall building energy use.

Yes

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

*Compared energy intensities between sites
Occupant behavioral programs*

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:

(No response)

3) Supplies (Paper):

Indicate which actions were taken in 2013:

Used less paper than previous year

No

Used only 100% recycled paper

No

Used some recycled paper

No

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

No

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

(No response)

Actions Taken to Reduce Emissions - continued

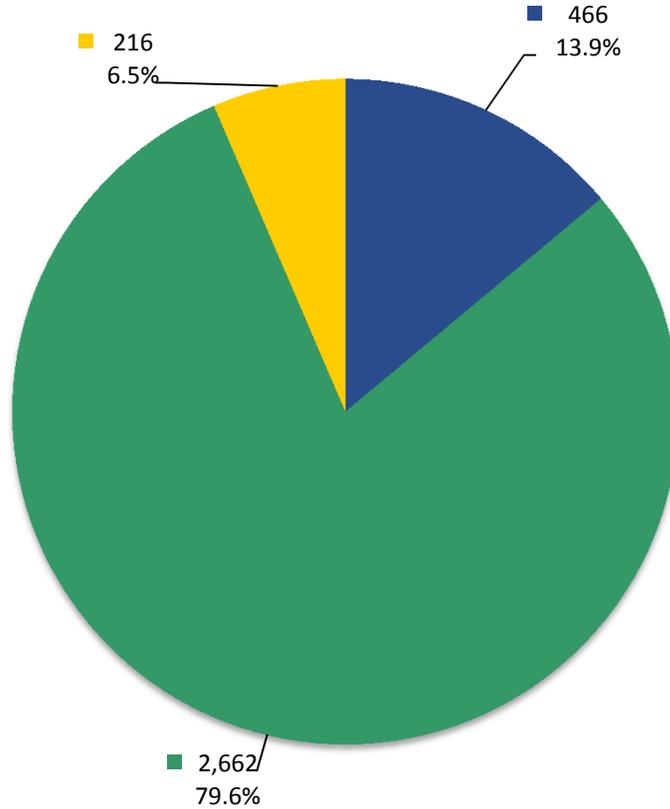
Explain how you plan to continue minimizing emissions in 2014 and future years:

Replace 20+ year old gas fired rooftop units
Replace old gas fired domestic hot water boilers
Replace classroom lighting fixtures with more efficient fixtures
Replace exterior lighting with LED fixtures
Replace space heating boilers at two sites with air-water heat pumps
Promote conservation behavioral programs for building occupants

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

No

**School District 37 - Delta
Greenhouse Gas Emissions by Source
for the 2013 Calendar Year (tCO₂e*)**



Total Emissions: 3,344

- 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 21, 2014 3:36 PM)

Total offsets required: **3,288**. Total offset investment: **\$82,200**. Emissions which do not require offsets: **56** **

*Tonnes of carbon dioxide equivalent (tCO₂e) 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 from the sources listed above must be reported. As outlined in the regulation, some emissions do not require offsets.