

Colorado Convention Center: 2009 Year End Sustainability Report



*Colorado Convention Center
700 14th St
Denver, CO 80202*

Executive Summary

The sustainability measures implemented at the Colorado Convention Center have generated \$1,060,015 in energy savings during the 12 month period from December of 2008 through November of 2009. These energy savings resulted in a 26% reduction in greenhouse gas emissions. The Convention Center also achieved a \$25,221 savings in water usage. Tracking purchasing during a short period in the year 2009 showed that on average, 64% of the Colorado Convention Center's purchases, by cost, are considered sustainable. The diversion of waste was also closely documented, showing an overall diversion rate of 43% due to recycling, composting, and donation efforts. These sustainability efforts generated an increase in publicity for the Convention Center as a premiere green meetings venue.

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I. Energy Analysis

Sustainable management strategies produced a 29% decrease in energy usage in 2009 in comparison to 2008, which resulted in \$1,060,015 in utility savings. This is a direct result of the Convention Center's sustainable energy policies. According to Energy Star, the Colorado Convention Center is currently 27% more efficient than the national average convention center.

- **Energy Usage by Type**

The table below summarizes the Convention Center's overall energy usage, with thousand-British thermal units (kBtu) serving as an equalizing factor between the different energy types. The Convention Center reduced its overall energy usage by 50,256,123 kBtu in 2009 as compared to 2008.

Energy Usage by Type, 2008-2009

Type	2008		2009	
	kBtu	% of Total	kBtu	% of Total
Electricity	85,531,678	48.7%	62,995,732	50.3%
Chilled Water	41,389,212	23.6%	22,928,028	18.3%
Steam	44,274,229	25.2%	34,630,937	27.7%
Natural Gas	4,286,400	2.4%	4,670,700	3.7%
Totals:	175,481,520	kBtu	125,225,397	kBtu

As illustrated by the table above, electricity represents the largest percentage of energy use across both years, consistently representing approximately 50% of the total kBtu. District steam comes in second with 25-27% of the total energy usage, followed closely by chilled water at 18-23%. Natural gas represents the smallest percentage of total energy use at 2-4%.

- **Savings by Energy Type**

The largest savings were seen in electricity consumption reduction, with an overall savings of \$500,210. Reduction in chilled water consumption yielded the second largest savings, with a total of \$364,513, followed by steam at a savings of \$197,790, kitchen gas at a savings of \$208, followed lastly by an increase in gas consumption measured by the primary meter, with an additional cost of \$2,705 over 2008.

Savings by Energy Type, 2009

Category	Revenue	2009 Avg. Cost
Electricity (Xcel Energy & solar panels combined)	\$500,210	\$0.08/kWh
Chilled Water	\$364,513	\$0.24/ton-hour
Steam	\$197,790	\$22.13/Klbs
Kitchen Gas	\$208	\$1.14/therm
Primary Gas	(\$2,705)	\$0.67/therm
Total:	\$1,060,015	

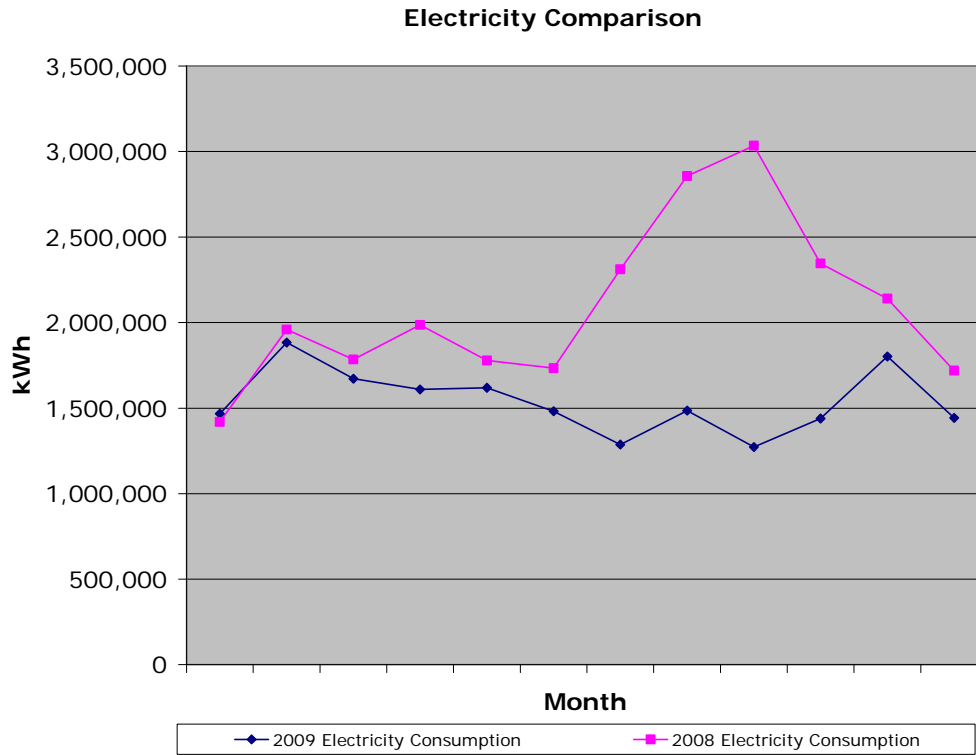
- **Electricity**

The Convention Center used 26.4% less electricity in 2009 in comparison to 2008. Based on an average \$.08/kWh cost of electricity in 2009, this reduction in electricity usage represents a savings of \$500,210. The total number of kWh consumed in 2009 from both Xcel Energy and the rooftop solar panels was down by 6,604,908 kWh from 2008.

Description	2008		2009		% Change
	Xcel	Solar	Xcel	Solar	
Average kWh Cost	\$.087	\$.090	\$.076	\$.089	-11.3%
Total kWh	25,063,093	4,808 (1 month)	18,079,233	383,760 (1 year)	-26.4%
Avg. kWh/mo.	2,088,591	4,808	1,506,603	31,980	-26.4%
Monthly data:					
Dec kWh	1,419,338		1,447,106	14,559	3.4%
Jan kWh	1,958,576		1,859,914	18,685	-3.8%
Feb kWh	1,783,791		1,636,271	28,386	-6.3%
Mar kWh	1,986,235		1,563,019	33,281	-19.0%
Apr kWh	1,778,327		1,575,825	32,956	-8.9%
May kWh	1,733,020		1,438,909	43,030	-14.5%
Jun kWh	2,311,609		1,243,558	42,841	-44.3%
Jul kWh	2,856,800		1,452,042	43,569	-48.0%
Aug kWh	3,034,454		1,239,477	45,938	-58.1%
Sep kWh	2,345,700		1,411,323	35,988	-38.6%
Oct kWh	2,140,328		1,783,077	24,010	-15.8%
Nov kWh	1,714,915	4,808*	1,428,712	20,517	-16.1%

*The solar panels were installed in November of 2008, which explains the lack of data prior to this date.

As illustrated by the table, the largest savings came in the months of June through September, with an average 47% reduction in electricity use.



- Solar Panels**

The rooftop solar panels on the Colorado Convention Center generated 383,760 kilowatt-hours (kWh) of electricity in the year 2009. This saved the equivalent of 282 metric tons (MtCO₂e) of carbon dioxide emissions as compared to conventionally produced electricity, which equates to the CO₂ emissions of the following:

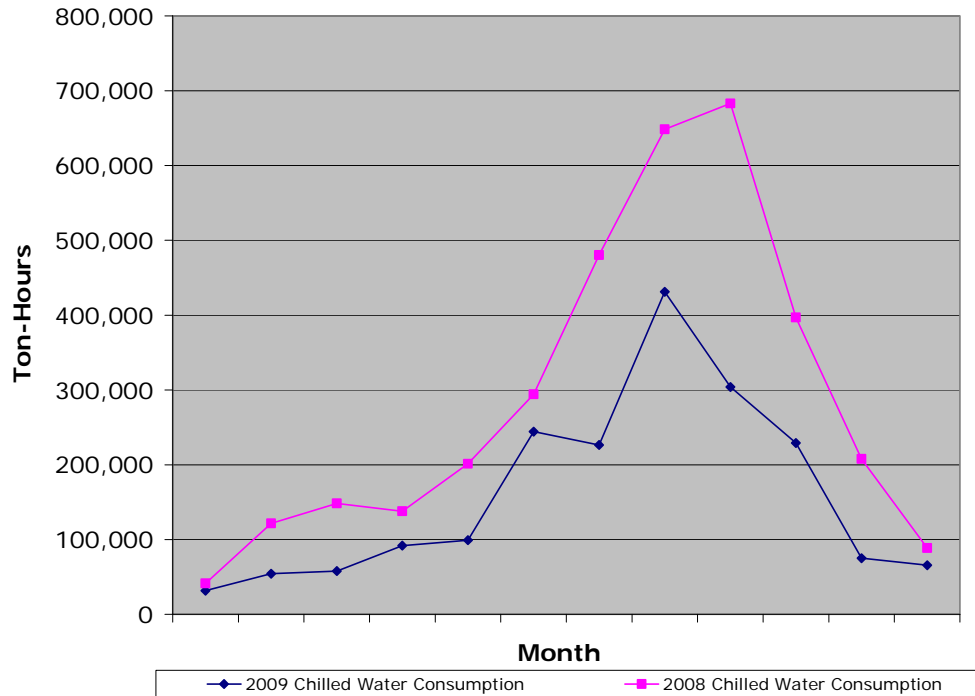
- o Saving 31,676 gallons of gasoline
- o Saving 655 barrels of oil
- o Planting 7,067 trees
- o Taking 53 cars off the road for a year

• **Chilled Water**

The Convention Center used 44.6% less chilled water in 2009 in comparison to 2008. Based on an average \$0.24 per ton-hour cost of chilled water in 2009, this reduction represents a savings of \$364,513. The amount of chilled water used in 2009 was down by 1,538,432 ton-hours from 2008.

Description	2008	2009	% Change
Average ton-hours Cost	\$0.17	\$0.24	38.0%
Total ton-hours	3,449,101	1,910,669	-44.6%
Avg. ton-hours/mo.	287,425	159,222	-44.6%
Monthly data:			
Dec ton-hours	41,401	31,535	-23.8%
Jan ton-hours	121,525	54,363	-55.3%
Feb ton-hours	148,278	57,870	-61.0%
Mar ton-hours	137,767	91,834	-33.3%
Apr ton-hours	201,351	99,090	-50.8%
May ton-hours	294,101	244,234	-17.0%
Jun ton-hours	480,281	226,484	-52.8%
Jul ton-hours	648,379	431,295	-33.5%
Aug ton-hours	682,964	303,891	-55.5%
Sep ton-hours	396,777	229,211	-42.2%
Oct ton-hours	207,782	75,232	-63.8%
Nov ton-hours	88,495	65,630	-25.8%

Chilled Water Comparison

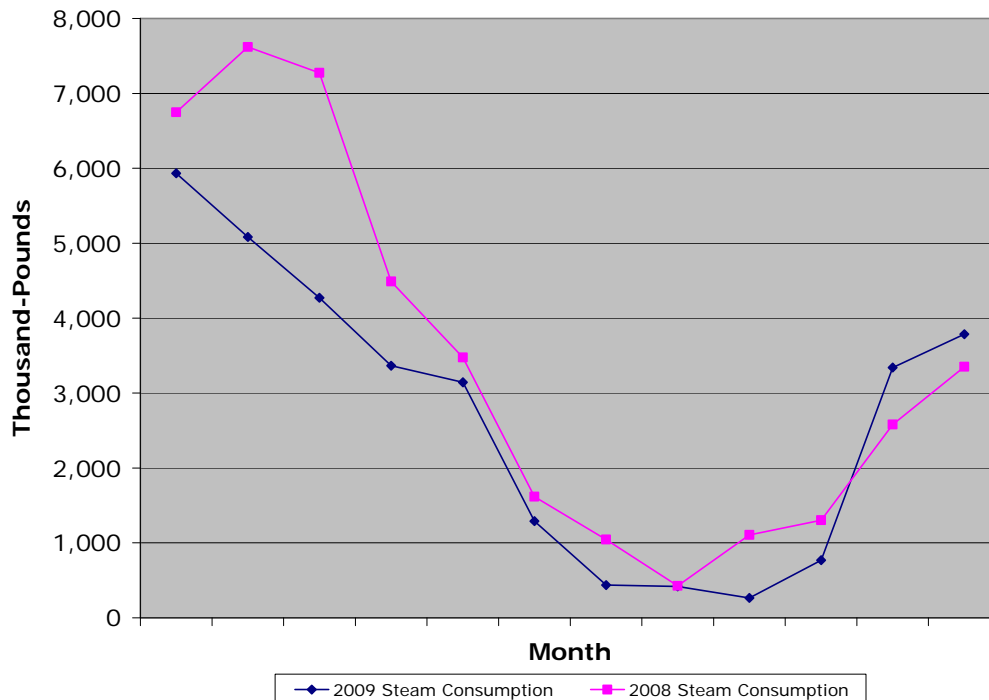


- **Steam**

The Convention Center used 21.8% less steam in 2009 in comparison to 2008. Based on an average price of \$22.13/Klb. of steam in 2009, this reduction represents a savings of \$197,790. The amount of steam used in 2009 was down by 8,937 Klbs. from 2008.

Description	2008	2009	% Change
Average Klbs Cost	\$19.61	\$22.13	12.9%
Total Klbs	41,033	32,095	-21.8%
Avg. Klbs/mo.	3,419	2,675	-21.8%
Monthly data:			
Dec Klbs	6,749	5,932	-12.1%
Jan Klbs	7,619	5,083	-33.3%
Feb Klbs	7,275	4,270	-41.3%
Mar Klbs	4,490	3,365	-25.1%
Apr Klbs	3,475	3,144	-9.5%
May Klbs	1,616	1,289	-20.2%
Jun Klbs	1,044	438	-58.1%
Jul Klbs	425	418	-1.7%
Aug Klbs	1,106	264	-76.1%
Sep Klbs	1,302	769	-40.9%
Oct Klbs	2,579	3,339	29.5%
Nov Klbs	3,352	3,785	12.9%

Steam Comparison

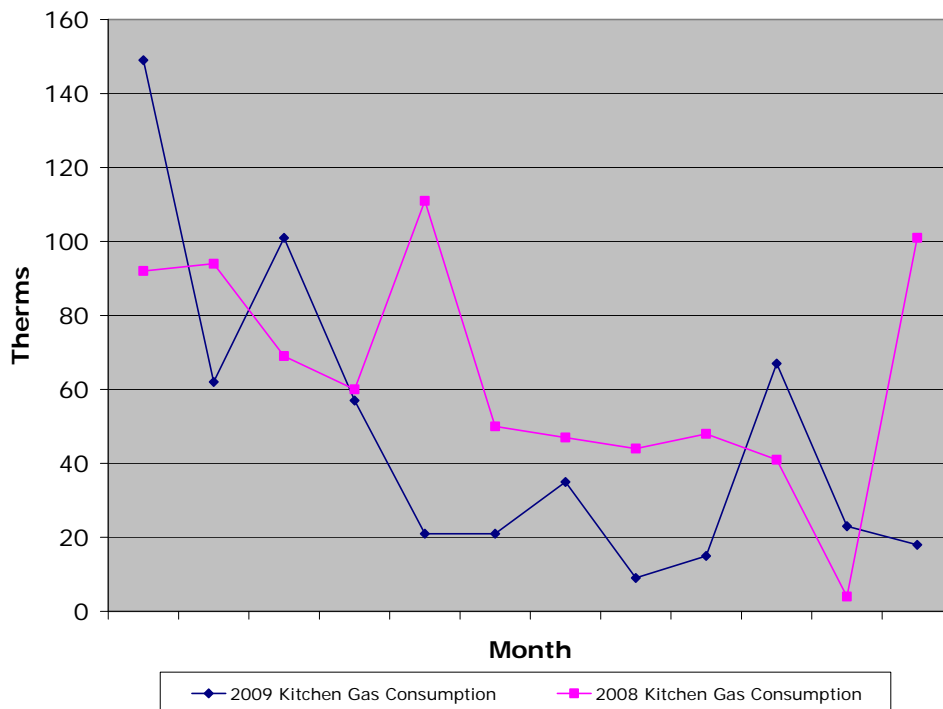


- Kitchen Gas**

The Convention Center has two natural gas meters on the property, one of which is used to measure the gas used in the kitchen. The kitchen gas use was 24.1% less in 2009 compared to 2008. Based on an average price of \$1.14 per therm in 2009, this reduction represents a savings of \$208. The amount of natural gas used in the kitchen in 2009 was down by 183 therms from 2008.

Description	2008	2009	% Change
Average therm Cost	\$1.21	\$1.14	-6.5%
Total therms	761	578	-24.1%
Avg. therms/mo.	63	48	-24.1%
Monthly data:			
Dec therms	92	149	62.0%
Jan therms	94	62	-34.0%
Feb therms	69	101	46.4%
Mar therms	60	57	-5.0%
Apr therms	111	21	-81.1%
May therms	50	21	-58.0%
Jun therms	47	35	-25.5%
Jul therms	44	9	-79.6%
Aug therms	48	15	-68.8%
Sep therms	41	67	63.4%
Oct therms	4	23	475.0%
Nov therms	101	18	-82.2%

Kitchen Gas Comparison

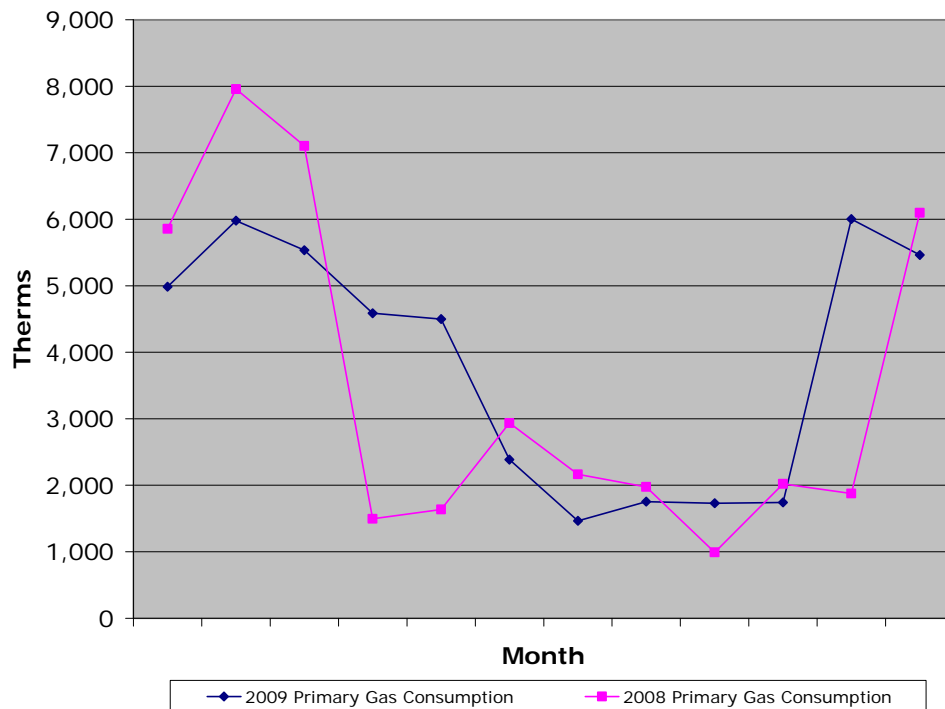


- Primary Gas**

The remaining natural gas meter (called the "primary gas" meter) at the Convention Center measures the amount of gas used for a small number of hot water heaters and various shows. The Convention Center saw an increase in primary gas consumption of 9.6% in 2009 compared to 2008. Based on an average price of \$0.67 per therm in 2009, this increase represents an additional cost of \$2,705. The amount of primary gas used in 2009 was up by 4,026 therms from 2008, due mainly to a higher usage in March, April, and October.

Description	2008	2009	% Change
Average therm Cost	\$0.61	\$0.67	9.8%
Total therms	42,103	46,129	9.6%
Avg. therms/mo.	3,509	3,844	9.6%
Monthly data:			
Dec therms	5,858	4,986	-14.9%
Jan therms	7,956	5,979	-24.9%
Feb therms	7,102	5,536	-22.1%
Mar therms	1,495	4,586	206.8%
Apr therms	1,634	4,499	175.3%
May therms	2,936	2,385	-18.8%
Jun therms	2,164	1,464	-32.4%
Jul therms	1,976	1,755	-11.2%
Aug therms	991	1,731	74.7%
Sep therms	2,021	1,742	-13.8%
Oct therms	1,874	6,004	220.4%
Nov therms	6,096	5,462	-10.4%

Primary Gas Comparison

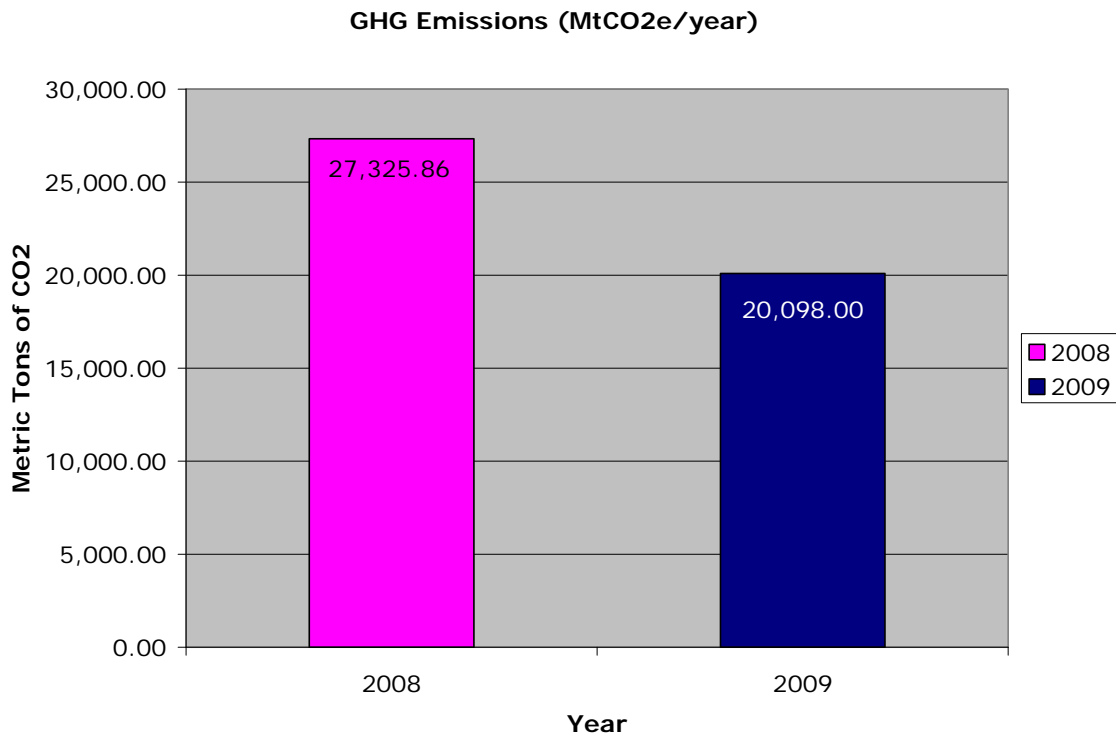


II. Greenhouse Gas Emissions

Due to the energy saved in 2009, the Colorado Convention Center reduced its greenhouse gas emissions by 7,227.86 tons of carbon dioxide (MtCO₂e) in comparison to 2008. This represents a 26.5% reduction in overall greenhouse gas emissions.

Greenhouse gases are gases in the atmosphere such as carbon dioxide and methane that absorb and emit infrared heat from the sun. The man-made production of such gases is largely thought to be the cause of recent climate change. By using less energy, the Colorado Convention Center has caused fewer greenhouse gases to be released into the atmosphere from the electric, steam, and chilled water plants which operate by burning coal or natural gas. This is equivalent to the following emissions reductions:

- Saving 737,571 gallons of gasoline
- Saving 15,249 barrels of oil
- Planting 168,128 trees
- Taking 1,254 cars off the road for a year



III. Water

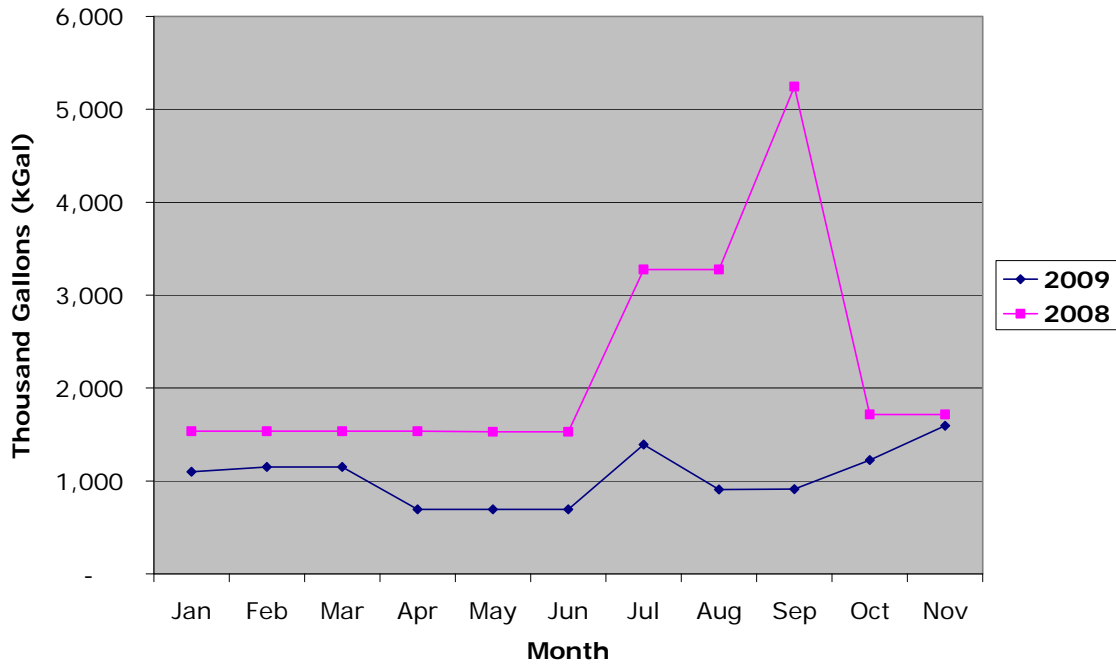
As a result of various water-saving plumbing fixtures and landscaping practices, the Convention Center used 48.4% less water in 2009 in comparison to 2008. Based on an average price of \$1.967 per thousand gallons of water in 2009, this reduction represents a savings of \$23,222. The amount of water consumed in 2009 was down by 11,814,000 gallons from 2008.

Description	2008	2009	% Change
Average price per kGal	-	\$1.967	-
Total kGal	24,434	12,620	-48.4%
Avg. kGal/mo.	2,036	1,052	-48.4%
Monthly data:			
Dec kGal	-	2,198	-28.45%
Jan kGal	3,070	2,304	
Feb kGal			
Mar kGal	3,073		
Apr kGal		2,083	
May kGal	3,060		
Jun kGal			-64.9%
Jul kGal	6,553	1,392	
Aug kGal		909	
Sep kGal	5,244	913	-82.6%
Oct kGal		1,226	-17.8%
Nov kGal	3,434	1,595	

There were irregularities in the bill structure between 2008 and 2009; see note below.¹

¹ Denver Water used a 2-month billing cycle up until June of 2009, when mid-month the billing structure was switched to a single-month format. Also, September of 2008 was billed as a single month for the purpose of tracking the water used during the Democratic National Convention, which caused the offset between the 2-month bills from each of the two years.

Water Comparison



As illustrated in the chart above, there was an abnormally high water usage in July-September 2008, most likely due to the presence of the Democratic National Convention. If the data from these 3 months is excluded, the Convention Center used 34% less water in 2009 compared to 2008.

IV. Sustainable Purchasing

The Colorado Convention Center purchases sustainable products in whenever it is economically feasible to do so. Sustainable purchases can be broken down into various categories. The following four categories have been included in this analysis: Office Consumables, Green Cleaning Equipment, Green Cleaning Products, and Durable Goods: Electric Powered Equipment. The Convention Center began tracking its sustainable purchases in August of 2009. Across these four categories, 69% of the purchases, by cost, are considered sustainable.

- **Office Consumables**

Office consumables are loosely defined as goods that are regularly used and disposed of throughout the course of business. Examples of office consumables include office paper, ink cartridges, office supplies, and batteries. Sustainable office consumables includes anything from paper with post-consumer recycled content or Forest Stewardship Council (FSC) wood to rechargeable batteries. From August-November of 2009, the Convention Center purchased a total of \$31,221 of office consumables, \$14,423 of which are considered sustainable goods, or 46.2% of the total office consumables purchased throughout this time period.

The U.S. Green Building Council's Leadership in Energy & Environmental Design (LEED) program offers a weighted system for calculating the sustainable value of such purchases. For example, products with double the minimum recycled content count for double their monetary value. Under this system, the Colorado Convention Center purchased \$29,438 worth of sustainable office consumables, or 94.3% of the total.

- **Cleaning Products**

Green cleaning products help maintain a healthy indoor environmental air quality through the use of environmentally-preferable chemicals. Such products include Green Seal certified chemicals, trash liners made from rapidly renewable materials, and Environmental Choice certified materials. From August-November of 2009, the Convention Center purchased \$93,083 worth of cleaning products, \$62,941 of which were considered green cleaning products, or 68% of the overall cost of cleaning products.

- **Cleaning Equipment**

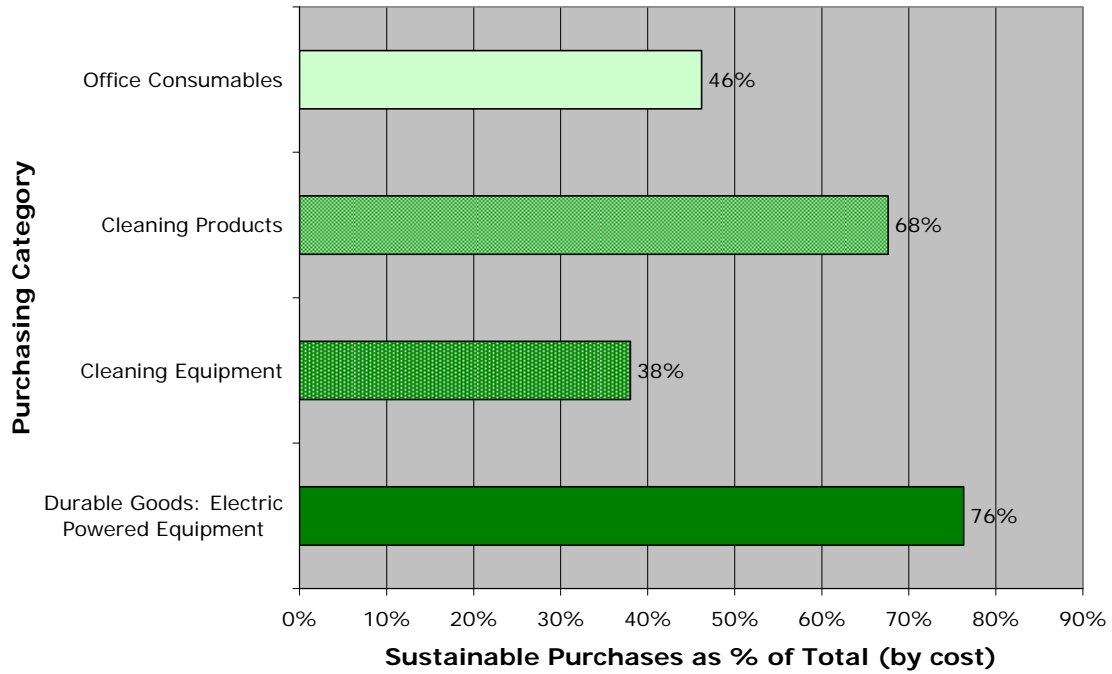
Green cleaning equipment is equipment used for cleaning the building that helps promote building occupant comfort. For example, equipment operating below certain decibel levels reduces noise associated with cleaning, and ergonomically designed equipment maximizes operator comfort. Of the 87 pieces of cleaning equipment cataloged, 38% are considered green cleaning equipment.

- **Durable Goods: Electric Powered Equipment**

Durable Goods: Electric Powered Equipment is equipment such as computers, monitors, radios, and fax machines that are either Energy Star or EPEAT rated (Electronic Product Environmental Assessment Tool). Being rated by such programs ensures that the equipment is energy efficient compared to similar products. From August-November of 2009, the Convention Center purchased

\$14,541 worth of Electric Powered Equipment, \$11,094 of which is Energy Star or EPEAT rated, or 76.3% of the overall electric powered equipment purchases by cost.

Sustainable Purchases, Aug.-Nov. 2009



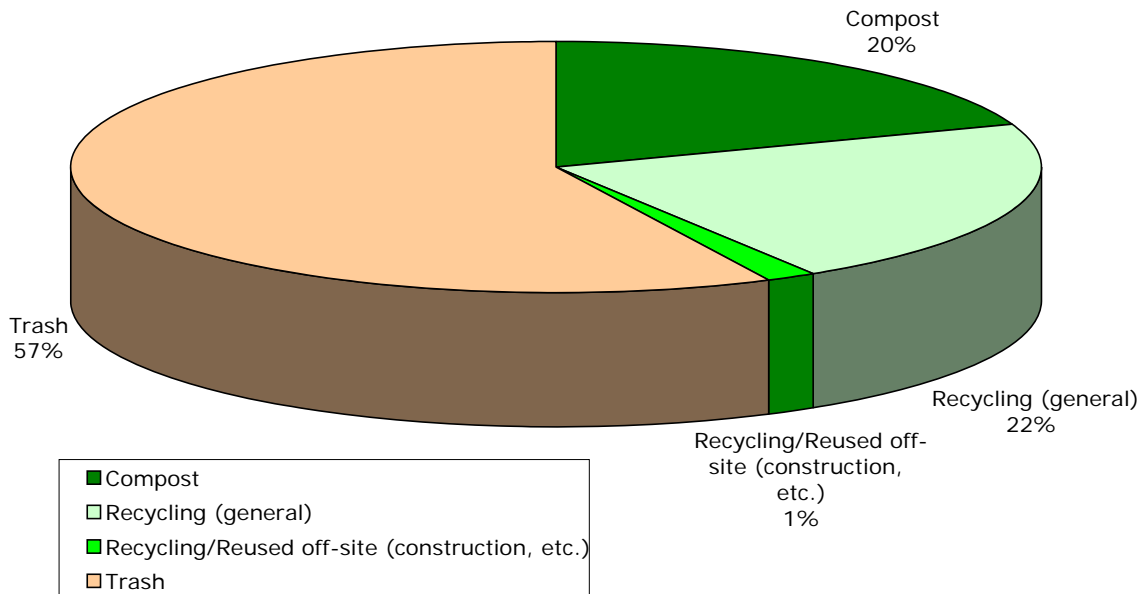
V. Waste

The Colorado Convention Center has in place a recycling and compost program throughout the facility to help minimize the amount of materials hauled to landfills. Additionally, when renovation projects occur, the Convention Center makes an effort to find local companies to donate materials removed from the building. The Convention Center performed a waste audit in October of 2009 and tracked its waste output throughout 2009 in an effort to better understand its waste tendencies, and to assess methods in which to increase participation in recycling and composting.

From January to November of 2009, the Convention Center produced a total of 1,966,479 pounds of waste, such as paper, toner cartridges, glass, plastics, cardboard, food waste, and construction materials:

- o 384,758 pounds of this waste, or 20% of the total, were composted through A1 Organics.
- o 425,500 lbs, or 22% of the total, were recycled through the commingled recycling program with Recycle America.
- o 28,919 lbs., or 1.5% of the total, were recycled through a special vendor or reused off-site. (This mainly applied to construction materials such as HVAC filters, insulation, or carpeting, in addition to the extra convention materials repurposed through the Resource Recovery Room.)
- o The remaining 1,127,302 lbs., or 57% of the total, were sent to landfill through the Waste Management trash hauling service.

Waste Diversion Rates 2009



The Convention Center also recycled 14 desktop computers through the City of Denver's recycling program. Additionally, the Convention Center has a battery recycling program in place with a goal of diverting at least 80% of discarded batteries from the trash.

VI. Publicity

The Convention Center has enjoyed a great deal of publicity for its green efforts, especially during the year 2009. The following table highlights the media attention the Convention Center received most recently, which increased greatly during the year 2009 as compared to the previous two years:

Date	Publication	Description
December 17, 2007	City of Denver press release	Highlights SMG's \$17,000 donation to the Mile High Million tree program as helping "Denver's reputation as an environmentally-friendly city."
September 3, 2008	PlanYourMeetings.com	Article titled "Greening of an Industry" highlights Lindsay Smith's work to create a green meeting certification system.
March 17, 2009	Colorado Meetings & Events Magazine	2009 Best of Colorado winner for "Best Green Meeting Facility."
March 18, 2009	City of Denver press release	Recognized as "leader in green venue management" for the rooftop solar panel installation.
April 20, 2009	Colorado Meetings & Events Magazine	Named Lindsay Smith as helping to "make Denver the first choice for planners organizing green meetings."
April 20, 2009	Tradeshow Week	Interview with Lindsay Smith, naming her "one of the few people in the industry with the full-time job of maintaining sustainable programs at a convention center."
October 21, 2009	Tradeshow Week	Talks about Lindsay Smith as the name that immediately comes to mind "when thinking about sustainability in Denver."
(ongoing)	Denver.org	Q&A with Lindsay Smith, highlighting green meetings do not cost more than conventional meetings.
(ongoing)	Greenprint Denver	Invites visitors to "plan a meeting in the city that hosted the greenest Democratic National Convention."

As illustrated in the table above, the sustainability features of the Colorado Convention Center were featured in the press 7 times in the year 2009 alone. This includes two pieces of marketing material from Denver.org and Greenprint Denver that are made available to the public on an ongoing basis.