

Environmental Analysis

<Two grade 8 DoRight Students>
Thunder Ridge Ski Area



Dear Thunder Ridge Staff and Management,

Thank you for taking your time to participate in our project. It was a pleasure to help your business to become environmentally friendly. The changes we offer you will help save money, attract customers, and save the environment. Keep in mind that these suggestions are completely optional. If you do however decide to apply these suggestions and follow up with us, you will receive a “Planet Saver Business” seal that you may put on brochures, posters and advertisements. We are happy to tell you we noticed many environmentally friendly aspects of your facilities. Such as double paned- sealed windows, low water flush toilets, non-toxic cleaning supplies, high ratings on your appliances and insulation, and an abundance of natural light.

However, there is room for productive changes that will help your business’ profit margins increase and it’s carbon footprint decrease. We found that your lighting had a great potential for improvement and we focused our efforts on researching ways to improve it.

Overview

Lighting- We have calculated all the lighting in the kitchen, bar, cafeteria seating area, downstairs bathrooms, upstairs bathroom, third floor loft, locker area (small rooms included), rental area, and rental store room. The following pages consist of data tables displaying the potential money you could save by changing even just a few of these lights. However, please note that these changes will save you money after a long period of time. (approximately a year) Also, these numbers aren't exact. We use a simple equation to find the amount of energy used in a month, and how much money it costs. The equation is:

$$\frac{w \cdot h \cdot c}{1000}$$

w= Wattage of the light bulb
h= Hours the light is used
c= Cost per kilowatt hour

What is a kilowatt hour? A kilowatt hour is a measurement of how many kilowatts of power are used in one hour. A kilowatt is a very large amount of power so a whole kilowatt is almost never used on small scale lights, they are measured in regular watts. The cost of electricity per kilowatt hour is usually \$. 20. This is the number we used in our equations to calculate your costs.

What are the different kinds of light bulbs? In your ski lodge we found and counted Incandescent and Florescent light bulbs. The Incandescent bulbs are regular light bulbs (in the bar). And Florescent bulbs are long tubes (in the kitchen, cafeteria, locker rooms, rental areas, and bathrooms) and flat bottomed bulbs (the 3rd floor).

Please note that when you shop for light bulbs, if the bulb is an LED bulb then the number on the package will be a wattage equivalent (for example "40 Watt equivalent"). When replacing the bulbs look for their wattage equivalent on the packages.

Flourescent and Incandescent to LED bulbs- LED bulbs can produce the same amount of lumens (how light is measured) as a regular bulb. The difference is that they use less energy and are cost-effective over time. Also, they produce light without creating heat, unlike regular bulbs. Lastly, LED

30 Watts	*12	\$0.20	$\frac{72}{1000}$	\$0.07	5	\$0.35	30	\$10.50
39 Watt	*12	\$0.20	$\frac{93.6}{1000}$	\$0.10	4	\$0.40	30	\$12.00

Summary: Total Cost per Month for Incandescent Light Bulbs- \$22.50

Summary: Total Cost per Month for Fluorescent and Incandescent Light Bulbs- \$633.90

Electricity cost using equivalent lumen LED bulbs in place of the existing fluorescent

Wattage	Hours	kw/h Charge	divide by 1000	Cost per day (1 bulb)	Number of Bulbs	Cost per day (all bulbs)	Multiplied by 30 (30 days)	Price for 1 month, 30 days (all bulbs)
30 Watt LED (Replacing the 59 Watt)	*12	\$0.20	$\frac{72}{1000}$	\$0.07	*88	\$6.34	*30	\$190.20
26 Watt LED (Replacing the 40 Watt)	*12	\$0.20	$\frac{62.4}{1000}$	\$0.06	*22	\$1.38	*30	\$41.18
34 Watt LED (Replacing the 65 Watt)	*12	\$0.20	$\frac{81.6}{1000}$	\$0.08	*15	\$1.35	*30	\$40.50
42 Watt Replacement (28 Watt)	*12	\$0.20	$\frac{67.2}{1000}$	\$0.07	*18	\$1.21	*30	\$36.29

Summary: Total Cost per Month for LED Fluorescent Replacement Light Bulbs- \$209.68

Electricity cost using equivalent lumen LED bulbs in place of the existing Incandescents

Wattage	Hours used in one day	kw/h Charge	divide by 1000	Cost per day (1 bulb)	Number of Bulbs	Cost per day (all bulbs)	Multiplied by 30 (30 days)	Price for one month, 30 days (all bulbs)
30 Watt Replacement (3 Watts)	*12	\$.20	$\frac{7.2}{1000}$	\$.01	*5	\$.05	*30	\$1.50
39 Watt Replacement (4 watt)	*12	\$.20	$\frac{9.6}{1000}$	\$.01	*4	\$.04	*30	\$1.20

Summary: Total Cost per Month for LED Incandescent Replacement Light Bulbs \$2.70

Summary of Savings By Replacing With LED Light Bulbs

Wattage	Price per Month	Replacement LED Wattage	Price per month	Savings Per Month by Replacing
59 Watt (FI)	\$396	30 Watt	\$190.20	\$205.80
40 Watt (FI)	\$66	26 Watt	\$39.60	\$26.40
65 Watt (FI)	\$90	34 Watt	\$40.50	\$40.50
42 Watt (FI)	\$59.40	28 Watt	\$37.80	\$21.60
30 Watt (In)	\$10.50	3 Watt	\$1.50	\$9.00

39 Watt (In)	\$12.00	4 Watt	\$1.20	\$10.80
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Final Summary:

Total Savings per Month from Replacing all Fluorescent and Incandescent Light-bulbs with LED Light-bulbs = \$314.10

By replacing with LED bulbs you save roughly 50% of the total cost of the original light-bulbs.

To learn more about LEDs versus traditional bulbs, here are our sources:

[http://www.energystar.gov/index.cfm?
c=lighting.pr_what_are#what_are](http://www.energystar.gov/index.cfm?c=lighting.pr_what_are#what_are)

[http://curiosity.discovery.com/question/led-advantages-conventional-
light-bulb](http://curiosity.discovery.com/question/led-advantages-conventional-light-bulb)

Conclusion

Thank you for your cooperation and patience. We hope you will benefit from our suggestions. Please report back to us via email, sarah.l.comer@brewsterschools.org, telling us about your experience (with or without changes). Our goal with this project is to pioneer in a new way of thinking about business throughout the community. If you make even a few changes, we will award you with the title of being a “Planet Saver Business”. (poster/logo) You can use it with advertisements and on your entrances and windows. Thank you for helping us promote this significant idea that businesses can be involved in the environmental movement.

Thank you again for your participation and help,

<student signatures>

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