

**Efficiency and Environmental Impact Audit**  
The Sharon Academy  
Caspar J. Anderegg  
(802) 763-2500

**Energy Audit For :** The Sharon Academy

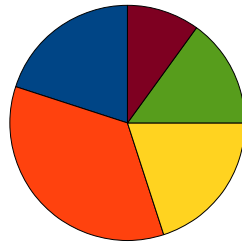
**Date Audited :** Monday, May 05, 2008

**Date Analyzed :** Saturday, May 10, 2008

**Budget :** \$0.00

### Top Priorities

Analysis of building's energy priorities



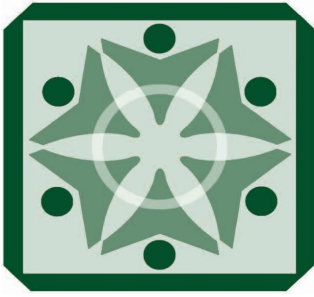
■ Water Priority : ■ Electricity Priority :  
■ Impact Priority : ■ Design Priority :  
■ Carbon Priority :

**Water Priority :** 20.00%  
**Impact Priority :** 35.00%  
**Carbon Priority :** 20.00%  
**Electricity Priority :** 15.00%  
**Design Priority :** 10.00%

This graph above shows you which areas are your top priority areas: Carbon Footprint and Heating, Resource Usage and Environmental Impact, Water Usage, Electricity Usage, and Design / Architecture and Materials. Included in this report is a sheet on each of these areas, and a list of ways you can reduce energy in each of these areas. If you have a limited budget, you should focus on the section that is noted as your top priority. However, all sections have some suggestions that are free, so be sure to read all sections. Each section has some suggestions written out; these suggestions are the ones recommended for your building. Costs are not included in these written out suggestions, but you may look up similar suggestions in the suggestion lists and assume that the costs shown on the lists are about the costs for the written suggestions.

\* Prioritized subjectively based on the views of the auditor

\*\* Cost Estimates on the following pages are given per unit.  
Estimate is probably lower than the actual price.



*Carbon Footprint and Heating*  
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Carbon Footprint and Heating is not one of your building's top priorities, but is still a significant area. This section, Carbon Footprint and Heating deals with certain things relating to carbon emissions, for example: idling your car, AFUE ratings on your furnace, and carbon offsets.

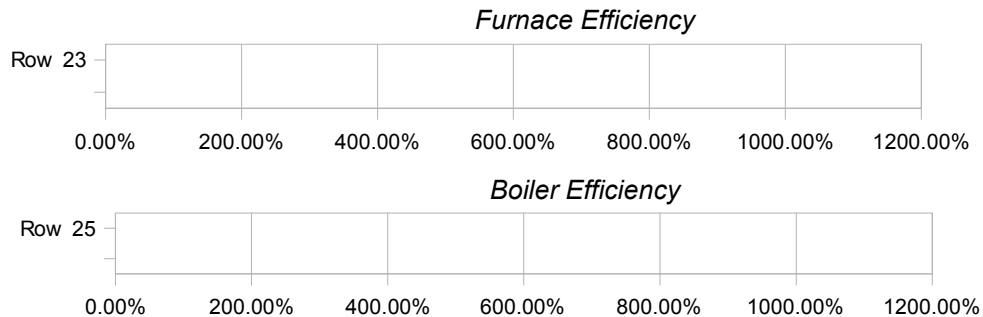
AFUE rating stands for annual fuel usage efficiency, it refers to the percentage of the fuel which you use that your furnace or boiler converts into heat. For example if your furnace has an AFUE rating of 90%, then for every hundred dollars that you spend on fuel, ten dollars of it is wasted.

**An Energy Star Furnace N/A**

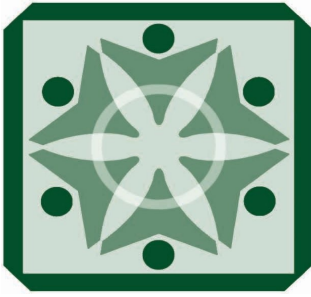
**Your Furnace N/A**

**An Energy Star Boiler N/A**

**Your Boiler N/A**



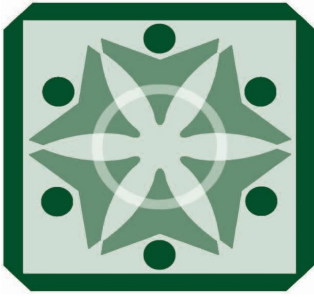
The Sharon Academy uses a Smith 19A series S/S-05, commercial, natural gas boiler for all it's heating needs. Commercial boilers are not rated in AFUE, so I cannot graph it's efficiency in relation to the Energy Star standard (which would usually be the graph above). The thermostats that I looked at were all set a little bit high, ranging from 68° to 70°. A thermostat turned down 1° can save you up to 2% on your annual heating bill. Another thing is idling cars in the parking lot. Idling a car for ten seconds takes more energy than turning off the engine and restarting it. There are people who will idle for ten minutes while they wait for their kid to come out of the building. However, I wont belabor the point because I know that the T-shirt group for Energy and the Environment is addressing this.



*Carbon Footprint and Heating: List*  
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**Estimated Cost : Way to Reduce Energy :**

<b>\$0.00</b>	When on vacation, lower the thermostat to 55°
<b>\$0.00</b>	Clean baseboard heaters and floor registers, make sure they are not covered
<b>\$0.00</b>	Don't idle your car, idling for 10 seconds takes more energy than restarting it
<b>\$0.00</b>	Turn down the thermostat, 1 degree can save you 2% on your heating bill
<b>\$0.00</b>	Close doors to rooms that don't need to be heated (guest rooms, etc.)
<b>\$0.00</b>	Cook efficiently, use the right size pot for the burner
<b>\$10.00</b>	Purchase carbon credits for your building
<b>\$30.00</b>	Bleed trapped air from hot water radiators
<b>\$30.00</b>	Adjust the time delay on your furnace's fan
<b>\$39.00</b>	Use area rugs (as long as you do not have radiant floor heating)
<b>\$50.00</b>	Get your furnace or boiler tuned up, at least every other year
<b>\$59.25</b>	Buy a digital, programmable thermostat
<b>\$150.00</b>	Get a heat exchanger to reclaim heat from the air that is vented out.
<b>\$250.00</b>	Seal the ductwork of your heating system
<b>\$250.00</b>	Use an electric lawnmower rather than a gasoline mower
<b>\$1,300.00</b>	Get a more efficient furnace or boiler



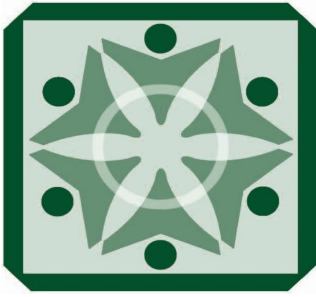
*Resource Usage and Environmental Impact*  
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Resources and Environmental Impact is your building's top priority. This section, Resource Usage and environmental Impact deals with certain things relating to resource usage, for example: printing and paper usage, trash and recycling, compost, and reusing things that do not need to be discarded.

There were some major issues with TSA's resource usage and impact. First there is compost. TSA has had a composting program in the past, but it is not currently running. Many of the things in the trash cans could be composted, reducing landfill waste as well as decreasing the amount TSA has to spend on getting rid of trash.

The second issue was recycling or throwing out items that could be reused. It takes much more energy to recycle a plastic bottle or a ziplock bag than it does to take it home, wash it out, and use it again.

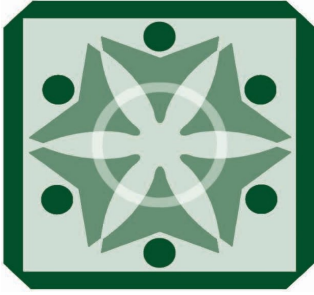
The biggest issue TSA has in this category is paper. Firstly the amount of paper that is being printed, and secondly the amount of paper being recycled. If you go into the computer lab and look at the things that are being printed out, there are stacks of things by both printers that have been printed but not used (wikipedia, paper duplicated, forgotten pages at the end of a document with nothing but a header on them). It is staggering. Then look at the amount of paper that is getting recycled unnecessarily. The recycling bins are full of paper (one sided paper, and even *blank paper*). Many rooms do not have folders for one-sided paper so there are hundreds of sheets per day that get recycled without need.



*Resource Usage and Environmental Impact: List*  
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**Estimated Cost : Way to Reduce Energy :**

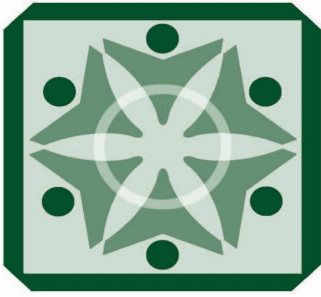
<i>\$0.00</i>	Double side the things that you copy and print
<i>\$0.00</i>	Start a recycling program at your building
<i>\$0.00</i>	Start a composting program at your building
<i>\$0.00</i>	Reuse things that you would normally recycle or throw away (bags, bottles, etc.)



*Water Usage*  
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Water Usage is not your building's top priority but is a significant area to consider. This section, *Water Usage*, deals with certain things relating to water usage, for example: low-flow shower heads and sinks, toilets, and water using appliances.

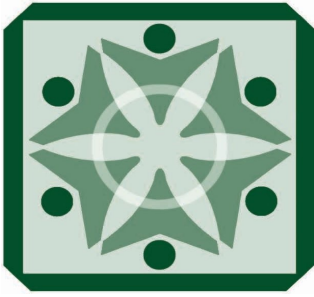
Water usage was good for the most part. The toilets do not leak, the sinks do not drip, and about half of the faucets had aerators on them. However, the sinks in Brian's room and in the art room should be outfitted with aerators. They are utility sinks, generally not used very frequently, so it is not a large concern. But, given that the art room sink is use mainly for cleaning up supplies, an aerator would increase water pressure while decreasing water usage.



*Water Usage: List*  
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**Estimated Cost : Way to Reduce Energy :**

<b><i>\$0.00</i></b>	Only run washing machines and dishwashers with a full load
<b><i>\$2.00</i></b>	Buy aerators for sinks and shower heads
<b><i>\$25.00</i></b>	Adjust water heaters down to 150°
<b><i>\$25.00</i></b>	Fix dripping sinks and leaking toilets
<b><i>\$650.00</i></b>	Buy energy star dishwasher
<b><i>\$700.00</i></b>	Get an on-demand water heater, rather than a system that constantly heats water
<b><i>\$900.00</i></b>	Buy a front-loading washing machine (as opposed to top loading)
<b><i>\$1,200.00</i></b>	Get a solar hot water system, to warm or pre-warm your water



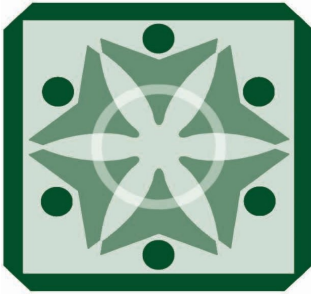
*Electricity Usage*  
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Electricity Usage is not your building's top priority but is an area to consider. This section, *Electricity Usage*, deals with certain things relating to water usage, for example: fluorescent and incandescent lights, refrigerators, and other appliances.

Electricity usage at TSA is very good for the most part. Almost all of the lights are fluorescent, rather than incandescent. Many of them were on timers and set to increments (off, 1/3, 2/3, and full). People at TSA never leave lights on, in fact they usually leave the lights off. However, there are still areas to improve.

One of these areas is unnecessary appliances. For example two refrigerators (which almost half of the power gained from the solar panels, old and new). Both of these refrigerators are older cheaper models with poor seals. Refrigerators are not the only unnecessary appliances either. There are microwaves scattered all over the school (only half of which are plugged in). The staff room has two coffee makers, within six feet of each other.

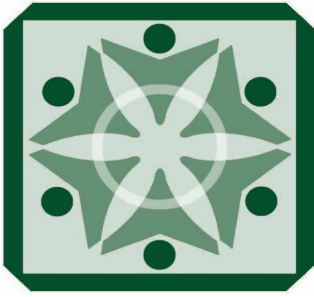
The second area where electricity is wasted is with computers, particularly screen savers. Screen savers are designed to prevent whatever is being displayed on the screen from burning into the screen itself. They force the monitor to refresh with some pattern to prevent damage to the monitor, but it is more effective to simply set the monitor to turn off. Screen savers not only take energy to keep the monitor on, they lock the computer into endless CPU wasting cycles that produce no effect other dragging at system resources. Setting the screen to turn off after a few minutes saves both of these energy costs. There are frequently three or five computers in the PC lab all on screen saver at once.



*Electricity Usage: List*  
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**Estimated Cost : Way to Reduce Energy :**

<b><i>\$0.00</i></b>	Clean the lint screen on your dryer
<b><i>\$0.00</i></b>	Do not use space heaters, use the building's built in heating system
<b><i>\$0.00</i></b>	Set computer monitors to go to sleep instead of displaying a screen saver
<b><i>\$0.00</i></b>	Turn off lights when you leave the room
<b><i>\$0.00</i></b>	Turn off your computer when not in use
<b><i>\$0.00</i></b>	Unplug appliances that create phantom load (computers, televisions, VCRs, etc.)
<b><i>\$0.00</i></b>	Unplug extra appliances (refrigerators, freezers, computers, etc.)
<b><i>\$20.00</i></b>	Use dimmer switches instead of flip switches
<b><i>\$38.00</i></b>	Use compact fluorescent light bulbs with about 1/3 of the wattage of incandescent
<b><i>\$14,000.00</i></b>	Get a system of solar panels for electrical generation

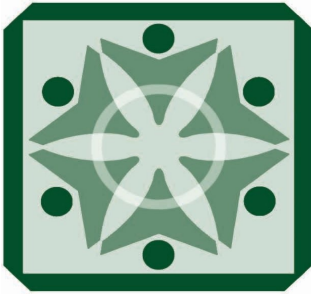


*Design, Architecture, and Materials*  
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Design, Architecture, and Materials is probably your building's lowest priority. This section, Design, Architecture, and Materials, deals with certain things relating to the layout of your building, for example: insulation, siding, natural light usage, and interior plants.

This area was, for the most part, great. The usage of natural light was incredible. The building is designed as well as possible given it's purpose (from fiber-cement siding to solar panels to radiant heating). The indoor plants in the common room are sorely in need of water, but that is to be expected.

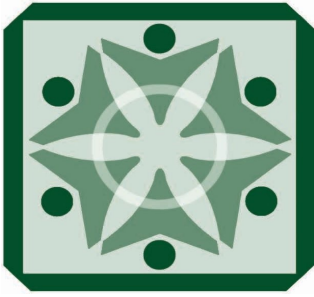
There was however, one major problem in this area: weatherstripping. Most of the main doors, the doors in the gym, and the doors in the boiler room are so poorly weatherstripped that you can see through the cracks. By weatherstripping the doors properly you would save vast amounts of energy and might possibly (gasp) make the the school warm!



*Architecture, Design, and Materials: List*  
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**Estimated Cost : Way to Reduce Energy :**

<b>\$0.00</b>	Use a hose to clean the outside portion of your AC unit
<b>\$0.00</b>	Open window shades on south facing windows during the day
<b>\$5.00</b>	Seal around outlets, light switch covers, mail slots, fireplace dampers, etc.
<b>\$5.00</b>	Caulk and seal around windows, especially loose windows.
<b>\$8.00</b>	Seal and weatherstrip exterior doors.
<b>\$15.00</b>	Insulate exposed portions of your foundation
<b>\$18.00</b>	Plant shrubs or trees to shade the exterior portion of your AC unit
<b>\$18.00</b>	Plant shrubs around your foundation
<b>\$25.00</b>	Get blinds for windows; close them at night
<b>\$25.00</b>	Put on storm windows
<b>\$25.00</b>	Install ceiling fans, they keep warm air from settling near the ceiling.
<b>\$40.00</b>	Get reflective film for your windows in the summer, to keep out the heat
<b>\$47.50</b>	Paint walls a paler color, using low VOC paint (price per gallon).
<b>\$50.00</b>	Get tracked shades for your windows, close them at night



*Audit Summary*  
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All in all, TSA is surprisingly energy efficient. The building is well insulated, the lighting system is efficient, and the solar panels are a good addition. The main areas that TSA needs to focus on are weatherstripping and waste (see the *Resource Usage and Environmental Impact* and the *Architecture, Design, and Materials* analysis sections).

TSA has long been active with issues outside of the the school (from the Dominican Republic trip to New Orleans). However, while we are so engaged outside of our community, the school itself has some efficiency issues. I believe that the overall problem lies in lack of understanding. The only way to reduce the amount of resources that teenagers waste is to show them the greater effects of their thoughtless action (in this case recycling a sheet of 1 sided paper).

I believe that there needs to be a program in place at TSA to teach students the little things that they can do, for free, within their own home, to reduce their environmental impact. People believe (and I am as guilty as anybody) that somehow their actions do not count, that it won't matter if they throw away that zip lock bag or recycle that piece of blank scrap paper, because it is just one time. The trouble is that everyone thinks this way, so the school winds up with reams of one sided paper in the recycling.

The *Auditor's Handbook* that I put together as part of this project is the first step in such a program. It outlines a system to audit your house, and gives ideas to reduce energy impact for little or no money.

TSA has made a good start, but it still has a long way to go.