



Cool School

Are we Carbon Neutral? Bethsaida School for Orphan Girls



The average American creates roughly 22 tons of carbon dioxide every year. That is twice as much as someone in the U.K. and nearly 200 times the amount put out by a Tanzanian. In this project we aim to show the carbon footprint of our school.



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Introduction:

In Bethsaida we consider ourselves 'green'. This has arisen out of necessity to save money but we always wondered how 'green' were we?

We currently have many green activities:

- We collect own rainwater - 1 litre of bottled water = **0.25 lb CO2**
- Rear chickens, pigs and cows, recycle manure
- Numerous fruit trees (& shade!) – 1 mature tree can absorb **7-15 lb**
- Vegetable plots

Where do we stand?:

Rank	Country	Annual CO2 emissions (10 ³ Tonnes)	Percentage
1	China	29,888,121	23
2	USA	7,031,916	18
3	India	1,742,698	6
9	UK	522,856	1.73
66	Ireland	43,604	0.14
98	Kenya	10,392	0.03
109	Tanzania	6,465	0.02

Electricity production:

What can one unit buy you?

Appliance	Units per hour
Instantaneous electrical shower	7 - 10 mins
Immersion water heater	10 - 20 mins
Cooker (1 large ring)	20 - 40 mins
Kettle	20 - 40 mins
Tumble dryer	20 - 40 mins
Toaster (2 slices)	40 - 60 mins
Washing machine	70 - 100 mins
Dishwasher	70 - 100 mins
Desktop computer (including monitor)	4 - 6 hours
TV 26" (71cm)	7 - 9 hours
100 watt ordinary light bulb	10 hours
20 watt energy saving (CFL) light bulb	50 hours

These figures give an average usage guide. Actual usage will depend on the age and efficiency of appliances.

Current production:

5 TWhr (25 TWh Ire)

Cost:

Tsh 158 / KWhr, 0.13 cent, Ire

ELECTRICITY

Conversion Factors

Electricity Source	Pounds (lbs) CO2 per kWh
Coal	2,249
Natural Gas	1,135
Oil	1,672

APPLIANCES - ENERGY VAMPIRES

Appliance	Off (but plugged in) (watts)	"Sleep" On but not in use (watts)	Active (on and in use) (watts)
Desktop Computer	284	213	7397
Laptop Computer	8.9	15.77	44.29
Conventional (CRT) Monitor	0.8	12.14	65.1
Flat screen (LCD) Monitor	1.13	1.38	27.61
Multi-Function Printer/Scanner/Copier, Inkjet	5.25	9.16	9.16
Stereo	1.66	4.11	6.8
Television	6.6	6.97	18.09
DVD/VCR player	5.64	13.51	15.33
DVR/PVR	36.88	37.64	29.29

Source: Standby Power Summary Table, Lawrence Berkeley National Laboratory <http://standby.lbl.gov/summary-table.html>

Method:

Program consists of the following steps:

1. Conduct a classroom energy audit –looking at classroom lighting & heating, energy 'vampires', waste & recycling, and transportation. We then estimate classroom CO2 emissions using data collected during the audit.
2. Create an action plan. Based on the audit findings, we look for ways each classroom can reduce their emissions, and come up with a Climate Action Plan.
3. Share our results!

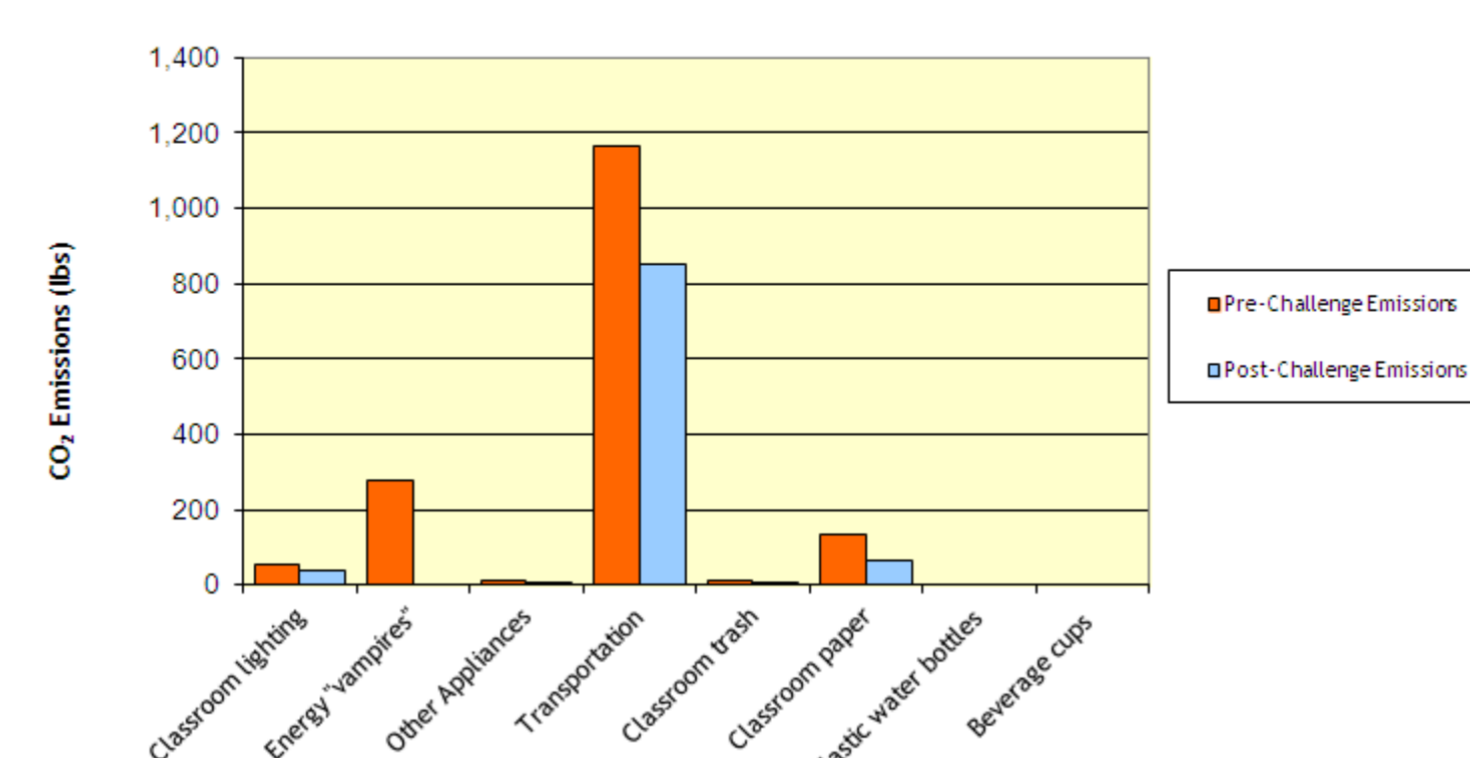
CLASSROOM AUDIT SUMMARY

Audit category	Estimated CO2 emissions per year		Potential savings per year		Cost Savings (Tsh)
	Pre-Challenge (lbs)	Post-Challenge (lbs)	CO2 Emissions Savings (lbs)	Electricity Savings (kWh)	
Classroom lighting	55	34	18	43.2	\$ 6,782.40
Energy "vampires"	279	0	279	661.6	\$ 103,874.72
Other Appliances	10	4	6	15.1	\$ 2,373.84
Transportation	1,164	854	310	n/a	
Heating	n/a	n/a	n/a	n/a	
Classroom trash	11	5	7	n/a	
Classroom paper	135	65	70	n/a	
Plastic water bottles	0	0	0	n/a	
Beverage cups	0	0	0	n/a	
TOTAL	1,654	963	691	720	\$ 113,030.96
This is equal to	83	48	35 lbs of CO2 per student		
TOTAL	9,531	6,357	6,760	2,570	\$ 331.89
This is equal to	318	212	225 lbs of CO2 per student		

Check it out!

CO2 Emissions: Pre- and Post-Challenge

This bar graph shows the difference between this classroom's emissions before and after taking action to reduce its carbon footprint. The orange bars represent the classroom's pre-challenge emissions; the blue bars represent the classroom's post-challenge emissions.



What does it mean?

Through your actions to reduce your carbon footprint in the Cool School Challenge, your classroom could save **691** pounds of CO2 emissions per year. This is the same as:

- The CO2 emitted by driving a car **712** miles.
- The CO2 emitted running a lightbulb for **5,133** hours (using standard U.S. electricity mix).
- The CO2 sequestered by **8** tree seedlings grown for 10 years.

What does it mean?

Through your actions to reduce your carbon footprint in the Cool School Challenge, your classroom could save **6,760** pounds of CO2 emissions per year. This is the same as:

- The CO2 emitted by driving a car **6,969** miles.
- The CO2 emitted running a lightbulb for **50,250** hours (using standard U.S. electricity mix).
- The CO2 sequestered by **79** tree seedlings grown for 10 years.

For comparison, Neilstown VEC, Dublin, Ireland produced: **9,531 lb (318 lb per student)** per year before survey.

Conclusions :

- Our carbon footprint was **83 lb** of CO2 per student
- By being aware of our energy usage we managed to reduce our carbon footprint by **35 lb** per student to **48 lb**
- Our current initiatives absorb more than **40 lb** per student
- Will be carbon neutral within **1 year!**

Future work: A lot done, more to do!

- Install solar power
- Begin recycling paper by turning it into charcoal
- Increase number of trees and vegetables to futureproof

References:

1. www.tanESCO.ie
2. www.coolschoolchallenge.org
3. www.esb.ie
4. www.treehugger.com

Acknowledgments

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