

P2 Internship 2007

EPA – Region 1

Energy Star Community Wide Energy Challenge

Thaddeus Webster and Danah Hashem worked with the EPA-Region 1 New England to promote EPA's Energy Star Community Wide Energy Challenge (ES Challenge) for their 2007 P2 intern project.



In 2007, the EPA promoted the ES Challenge to increase the efficiency of New England communities. Thaddeus and Danah targeted municipal buildings and schools in seven towns in New England. To complete the challenge the community must commit themselves to improving energy efficiency and to achieve at least a 10 percent energy reduction in the future. The towns must also promote energy efficiency and use of renewable energy to the residents, companies and organizations in the community.

In order for a town to complete the project, each public building must be benchmarked for its "energy use intensity" (EUI), which is the annual amount of energy being used by the building per square foot. This gives a baseline for each building. The EUI is entered into a system that takes into account the parameters for the type of building. For example, schools will have a different energy use than an office building due to the amount of people housed there, computer usage and general use. Each building score for a particular town is then put into an equation to give the town a score between 1 and 100. The towns with a score of 75 or better are exceeding the expectation for energy reduction and it becomes increasingly harder to decrease their energy usage by 10 percent. Towns below 75 will need to evaluate the usage and use simple techniques to start to reduce their impact, such as retrofitting light fixtures.

Examples of Some Benchmarked Buildings	EUI (kBtu/sq.ft./yr)
Road Pumping Station	2,800
City Hall	200
Fire Station	190
Ice Arena	230
Police Station	190
Public Works Department	120
Revenue Office	145
Community Center	60

Wastewater Treatment Plant	900
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Thaddaeus worked with four towns to benchmark their municipal buildings, to introduce energy reduction techniques, and to show them how to save money by implementing these techniques. The results of the towns are as follows.

If 10% of energy is reduced...

Town (# of BM'ed bldgs)	Energy Used (kBtu)	CO2 not emitted (metric tons)	Cost Savings	55 gallon drums
Berwick (4)	2,545,911	161	\$5,989	374
Dover (13)	45,905,866	850	\$81,979	1,977
Rochester (8)	22,351,480	414	\$43,000	963
Somersworth (9)	17,725,341	328	\$60,244	763
Total	88,528,708	1,753	\$189,098	4,077

Danah worked with three towns to benchmark their municipal buildings and reduce their carbon footprint. The results of the towns are as follows.

If 10% of energy is reduced...

Town (Initial score)	Energy Used (kBtu)	CO2 not emitted (metric tons)	Cost Savings	55 gallon drums
Easton (37.5)	2,235,525	28	\$248	66
Mansfield (40.5)	44,563,177	562	\$99,084	1,306
Milton (33)	7,465,531	94	\$14,286	219
Total	54,264,233	684	\$113,618.00	1,591

The EPA Energy Star Community Wide Energy Challenge provides the tools necessary for municipalities to successfully reduce energy consumption. One of the most compelling attributes of

the ES Challenge is that it involves and educates members of the community on how to reduce energy consumption, which in turn improves both their surrounding environment and public health.

Freudenberg-NOK General Partnership

Waste Recovery, Cardboard Disposal and Evaporator Residue

Mike Gagnon, a UNH student, spent the summer of 2007 working on a pollution prevention project with Freudenberg-NOK General Partnership in Bristol, NH. Mike worked in four areas of the plant to reduce the generation of waste.

Project #1 Rubber Waste Recovery. Originally, the scrap rubber generated from the facility went to a landfill. In 2006 there was 67 tons of rubber scraps removed from the plant, which equivocates to approximately a \$10,500 disposal cost. Through Mike's research, he was able to find a transporter to take the rubber for recycling.

Project #2 Cardboard Disposal. Prior to Mike's internship, only about 15 percent of the cardboard was recycled from the plant on one process line. The remaining 85 percent was thrown away. In 2006, 375 pounds of cardboard was thrown away per shift, which is equivalent to 140 tons a year. NOK added a second baler, which will reduce that waste and the number of times the compactor is emptied by half. This savings, included with the revenue generated from recycling the cardboard, is approximately \$19,000.

Project # 3 Evaporator Residue. In 2006, evaporator residue was generated every two weeks. In 2007, evaporator residue was generated twice a week increasing to 65 tons of hazardous waste costing \$43,000. By adding a filter aid into the process, suspended solids would be reduced by two-thirds thus significantly increasing the time between change outs.

	2007	1/3 Reduction	SAVINGS
Drums of Residue	283	189	94
Weight (lbs)	129,972	86,648	43,324
Cost	\$42,778	\$19,628	\$23,150

Project #4 A Recycling Committee. Mike helped to set up a recycling committee that involved a facility-wide program to reduce the amount of employee generated waste leaving the facility for landfill. The project started with collecting employee cans during the work days. The revenue raised from recycling goes into an employee incentive fund. In the first two weeks, 38 pounds of aluminum cans were collected, yielding \$19 to the fund.

Overall, Mike saved the company approximately \$52,000.

Electronic Manufacturers

Hazardous waste inventory and input-output chemical flow

Pin Chiang, a UNH student, interned at an electronic manufacturing company. His primary duty at the facility was to create a process flow diagram of its waste streams. In order to complete this thorough analysis, he completed a chemical inventory, evaluated the chemical to process applications, devised input-output flow charts, and then applied effective waste reduction measures using pollution prevention techniques.

To complete the chemical inventory review, Pin checked inventory of all chemicals within the facility. This information was entered into a master chemical database.

Once the chemical inventory was complete, Pin collected data on each of the processes which include coating, bonding, SMT, coupons, aqueous wash and silk screening. Each process was evaluated. This helped to identify any and all waste streams. It also help to show where chemical reduction could be implemented and decrease the amount of waste in each of the waste streams. Pin also updated all of the waste codes for all hazardous materials onto each flow chart.

Suggestions for pollution prevention initiatives:

UV Coating

- Switching to UV coating with no solvents can reduce waste.

Parts Cleaner Recycling

- Recycling the parts washer fluid for fuel blending. With the introduction of the new coating materials, this process may be eliminated.