

Energy Star Benchmarking Sandwich, MA

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ENERGY STAR

EPA Community Energy Challenge

- Challenges communities to save money and reduce air pollution.
- Step 1
 - Take pledge to participate in community energy program
- Step 2
 - Assess energy use
- Step 3
 - Understand opportunities for efficiency
- Step 4
 - Recognize successes

Purpose

- To use the Environmental Protection Agencies benchmarking tool to collect energy use data and then rate the buildings in the study.
- With the buildings benchmarked the town will then be able to assess low performing buildings and make improvements based on the findings.

EPA's Portfolio Manager

- This program gives everything a user needs to get started benchmarking buildings.
- Benefits
 - Easy information input
 - Calculates efficiency
 - Immediate results

Energy Star Rating

- The rating is derived using a combination of the total energy use, total floor area, and the other buildings specifications.
- Scale
 - 75 and above- Most Efficient
 - 50- Average efficiency
 - 1- Worst efficiency

Benchmarking Steps

- The website clearly explains the instructions needed to enter the information
 - http://www.energystar.gov/index.cfm?c=evaluate_performance.us_portfoliomanager
- Step 1
 - The first step of benchmarking the schools was to locate the following information
 - Zip Code
 - Gross floor area
 - Open on weekends (Yes/No)
 - % of floor area that is cooled
 - % of floor area that is heated
 - Number of personal computers
 - Presence of cooking facilities
 - High School (Yes/No)

Benchmarking Steps

- Step 2
 - Gather energy use data for a period of at least one year or more
 - Enter data into the EPA benchmarking tool

Step 3

- Analyze Data and Formulate Solutions



Buildings Benchmarked

- The Sandwich High School
- The Henry T. Wing School
 - The Forestdale School
 - The Oak Ridge School

Sandwich High School

- 2009 Energy Star Rating: 67 of 100
 - Above average efficiency
- Building Specifics
 - 248,835 sq. ft
 - 333 personal computers
 - 3 walk-in refrigerators
 - Open on weekends
 - Onsite cooking
 - 80% of floor area cooled
 - 100% of floor area heated
 - 12 months of use

Oak Ridge School

- 2009 Energy Star Rating: 52 of 100
 - Just above average
- Building Specifics
 - 122,500 sq. ft
 - 126 Personal Computers
 - 3 walk-in refrigerators
 - Not open on weekends
 - Onsite cooking
 - 10% of floor area cooled
 - 100% of floor area heated
 - 10 months of use

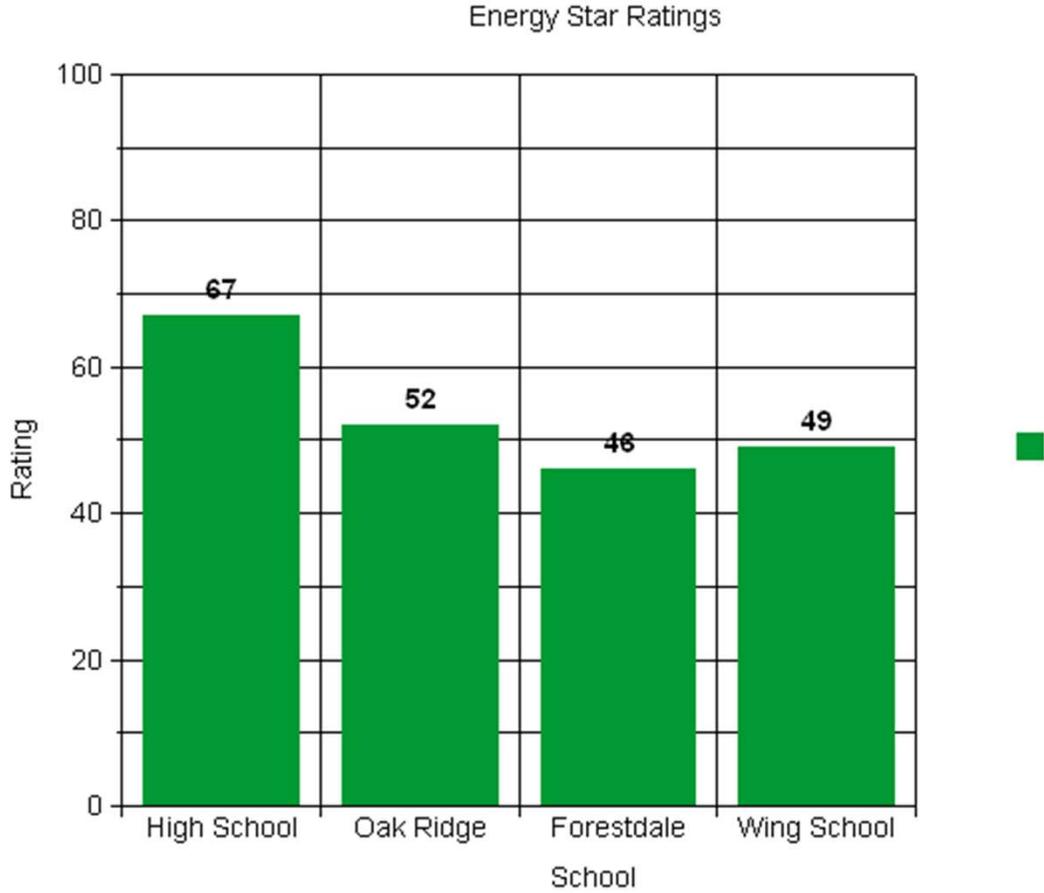
Forestdale School

- 2009 Energy Star Rating: 46 of 100
 - Below average
- Building Specifics
 - 122,500 sq. ft
 - 126 Personal Computers
 - 3 walk-in refrigerators
 - Not open on weekends
 - Onsite cooking
 - 10% of floor area cooled
 - 100% of floor area heated
 - 10 months of use

Henry T. Wing School

- 2009 Energy Star Rating: 49 of 100
 - Just below average
- Building Specifics
 - 104,639 sq. ft
 - 126 Personal Computers
 - 3 walk-in refrigerators
 - Not open on weekends
 - Onsite cooking
 - 40% of floor area cooled
 - 100% of floor area heated
 - 10 months of use

Energy Star Ratings



Total Energy Consumption Sandwich High School

- Natural Gas
 - 148,690 ccf = \$258,713.60
- Electricity
 - 2019558 kwh = \$222,151.38

Total Energy Consumption Oak Ridge School

- Natural Gas

 - 52,518 ccf = \$93,159.85

- Electricity

 - 585,312 kwh = \$64,384.32

Total Energy Consumption Forestdale School

- Natural Gas

 - **59,567 ccf = \$105,366.26**

- Electricity

 - **582,024 kwh = \$64,023.00**

Total Energy Consumption Wing School

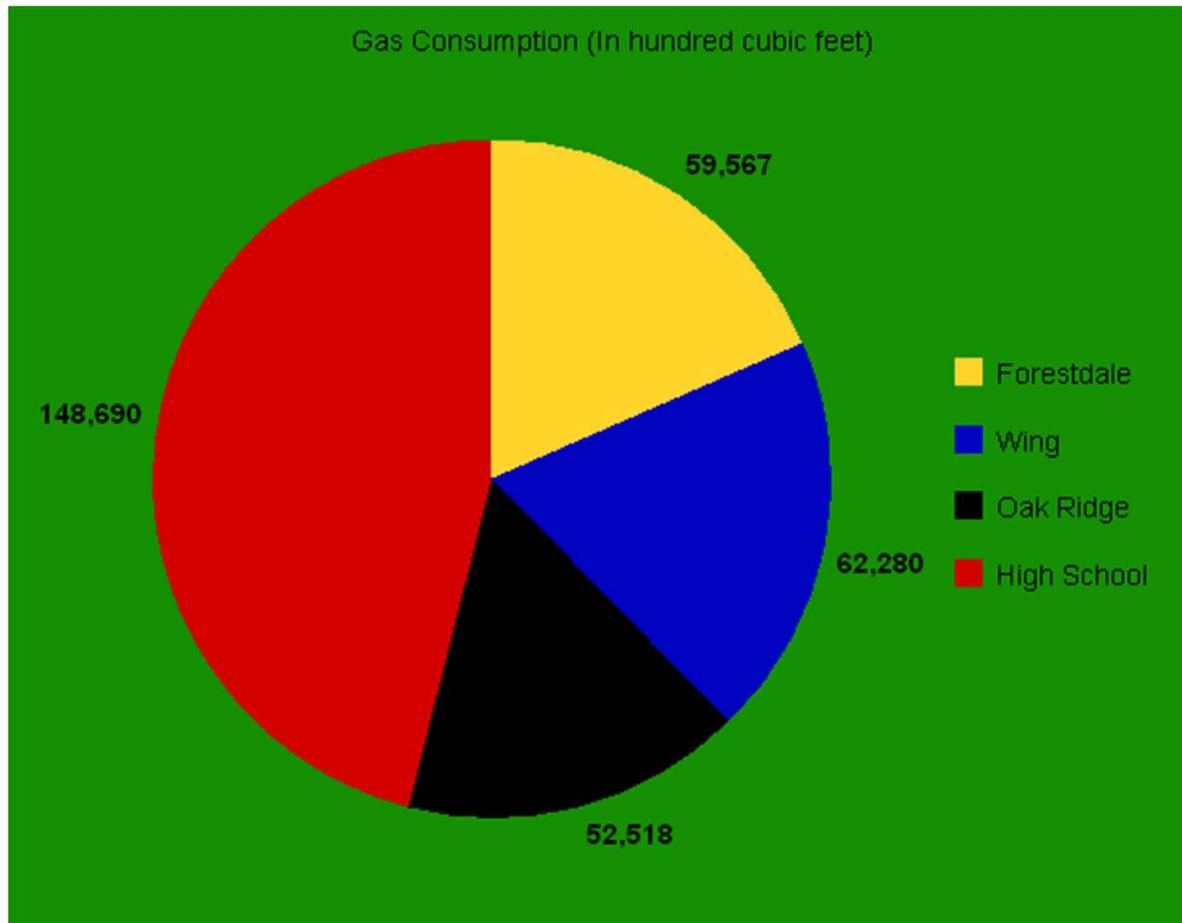
- Natural Gas

– 62,280 ccf = \$109,218.40

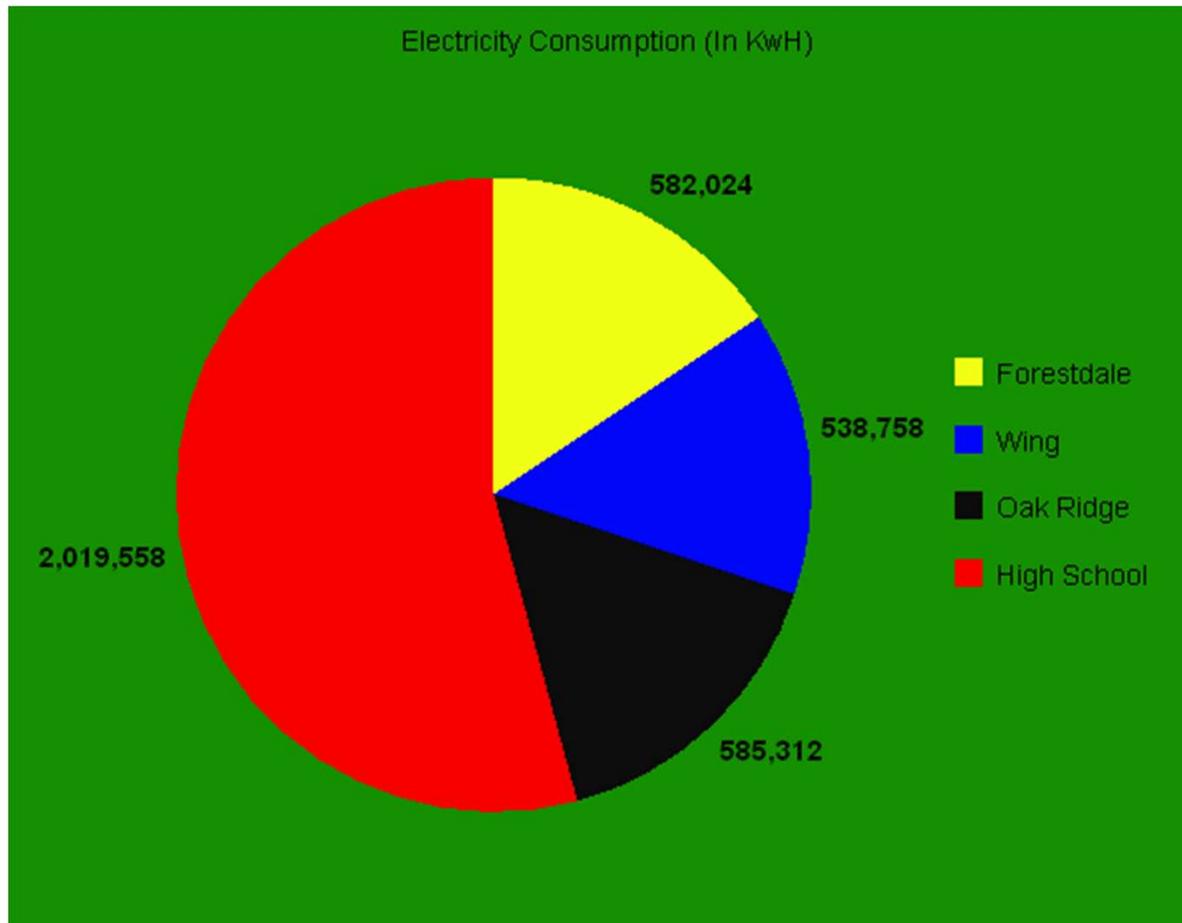
- Electricity

– 538,758 kwh = \$59,263.38

Gas Consumption



Electricity Consumption



Carbon Emissions Sandwich High School

- Total Carbon Emissions
 - **2,193** metric tons of CO₂ equivalent
- Equal to...
 - Annual emissions from **419** cars
 - CO₂ emissions from **3,373** barrels of oil
 - Annual CO₂ emissions from **195** homes

Carbon Emissions Oak Ridge School

- Total Carbon Emissions
 - **647** metric tons of CO₂ equivalent
- Equal to...
 - Annual emissions from **124** cars
 - CO₂ emissions from **1,504** barrels of oil
 - Annual CO₂ emissions from **58** homes

Carbon Emissions Forestdale School

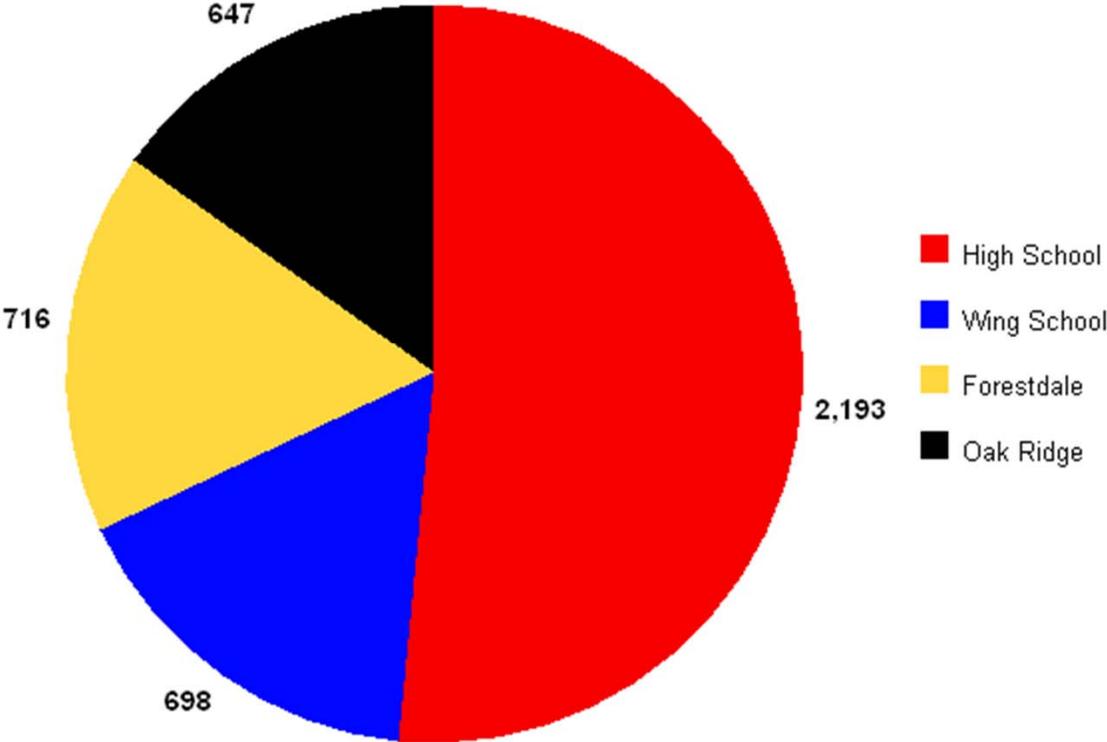
- Total Carbon Emissions
 - **716** metric tons of CO₂ equivalent
- Equal to...
 - Annual emissions from **137** cars
 - CO₂ emissions from **1,665** barrels of oil
 - Annual CO₂ emissions from **64** homes

Carbon Emissions Wing School

- Total Carbon Emissions
 - **698** metric tons of CO₂ equivalent
- Equal to...
 - Annual emissions from **134** cars
 - CO₂ emissions from **1,624** barrels of oil
 - Annual CO₂ emissions from **62** homes

Total Carbon Emissions

Total Carbon Emissions CO2 equivalent (In Metric Tons)



Total Energy Costs

- **All Four Schools**
 - Natural Gas: **\$566,458.11**
 - Electricity: **\$409,822.08**
- **Total Energy Cost for 2009**
 - **\$976,280.19**

Conclusions

- Sandwich High School performs the best out of the four public schools
 - Even though it does use more than half of the schools combined energy use
- Forestdale had the worst rating of the four schools
 - There is still plenty of room to improve in all four of the schools
- Even though the High school is most efficient it still uses the majority of the energy consumed by the four schools.

Goal for Town

- To accomplish a 10% decrease in energy use over the course of 5 years.

Steps To 10% Decrease

- Decrease in behavioral energy use
 - Turning off lights when leaving room, Unplugging computers at night.
- Updates to building
 - New more insulated windows, more energy efficient light bulbs.
 - Follow upgrade manual link under “Helpful Energy Efficiency Tips”.
- Renewable Energy Sources
 - Installing solar panels, use of wind turbines.

Renewable Energy Sources

- **Solar Panels**
 - **Plenty of roof space at the High School**
 - **Pollution free during use**
 - **Operating costs low**
 - **With modern technology, energy payback time is approximately 1.5 to 2 years**

Helpful Energy Efficiency Tips

- http://www.energystar.gov/index.cfm?c=business.bus_upgrade_manual
 - This service provided by the Energy Star Program will guide the user in creating a more energy efficient building.

Benefits of Achieving Goals

- 10% decrease in energy use
 - Equal to saving **\$100,000** each year
- Smaller carbon footprint

Acknowledgements

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- Doug Lapp
 - Town of Sandwich Assistant Town Manager