



TRANE[®]

Building Services

Trane Energy Analyzer[™] Report
1 Sample
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Energy Assessment for 1 Sample

1. Introduction

The purpose of this energy assessment is to provide information about how energy is used, a point of reference for comparisons to other similar facilities, and direction about potential energy savings opportunities for 1 Sample. The assessment and recommendations are based upon the information provided to the Trane Energy Analyzer¹. Refer to the Trane Energy Analyzer to obtain more detailed information about the information and data that was used to conduct this energy assessment.

The accuracy of this assessment and the resulting recommendations are directly influenced by the degree of accuracy of the data that was input to the Trane Energy Analyzer. In addition to the data inputs, a number of other factors such as weather variations, building occupancy and operation schedules can affect energy usage and consequently energy cost savings. Typical characteristics² for these other factors were used in the simulation model to calculate energy consumption and conduct this assessment. The assessment is not intended to predict the future effect on any changes made to 1 Sample but rather to provide guidance and focus on the greatest potential energy savings opportunities and recommend next steps.

2. Why Energy Efficiency is Good Business

Energy use and thus, improvements in energy efficiency can contribute to the achievement of long-term organizational objectives. Links between energy efficiency and business objectives can be direct, as in the case of improved operational efficiency and reduced costs, or indirect, such as with improved employee productivity. Listed below are a few examples how energy efficiency can contribute to business success.

Examples of Business Objectives with Links to Energy Efficiency

- Improved operational efficiency
- Reduced operating costs
- Improved product quality
- Improved air quality
- Improved tenant/occupant satisfaction
- Improved employee productivity
- Improved contribution to environmental protection & sustainability
- Improved corporate image

3. How You Use Energy Today

It is useful to compare energy consumption and use patterns with other similar facilities in assessing your current state and to develop improvement targets for the future. The sections below provide benchmarks against an "industry average" and an energy efficient³ middle/high school similar in size to your facility and located in the same geographic region.

¹ The Trane Energy Analyzer can be accessed through <http://energy.trane.com>

² Typical case - for these factors, the model assumes the most common practice or value to calculate energy use.

³ The energy efficient facility used in these comparisons use energy savings technologies, which are typically cost effective in new and significantly renovated buildings.

3.1 Total Consumption

Annual energy costs for your facility are: \$1.80 per ft². This is 55.8% higher than the industry average for a typical middle/high school in the South, South Atlantic region.

In contrast, energy costs for a new, energy efficient middle/high school would amount to approximately \$0.83 per ft². For most facilities, it is possible to achieve this level of efficiency by implementing readily available energy efficiency strategies and management practices.

Figure 1: Comparison of Energy Use for 1 Sample to the Industry Average and an Energy Efficient middle/high school (\$/ft²)

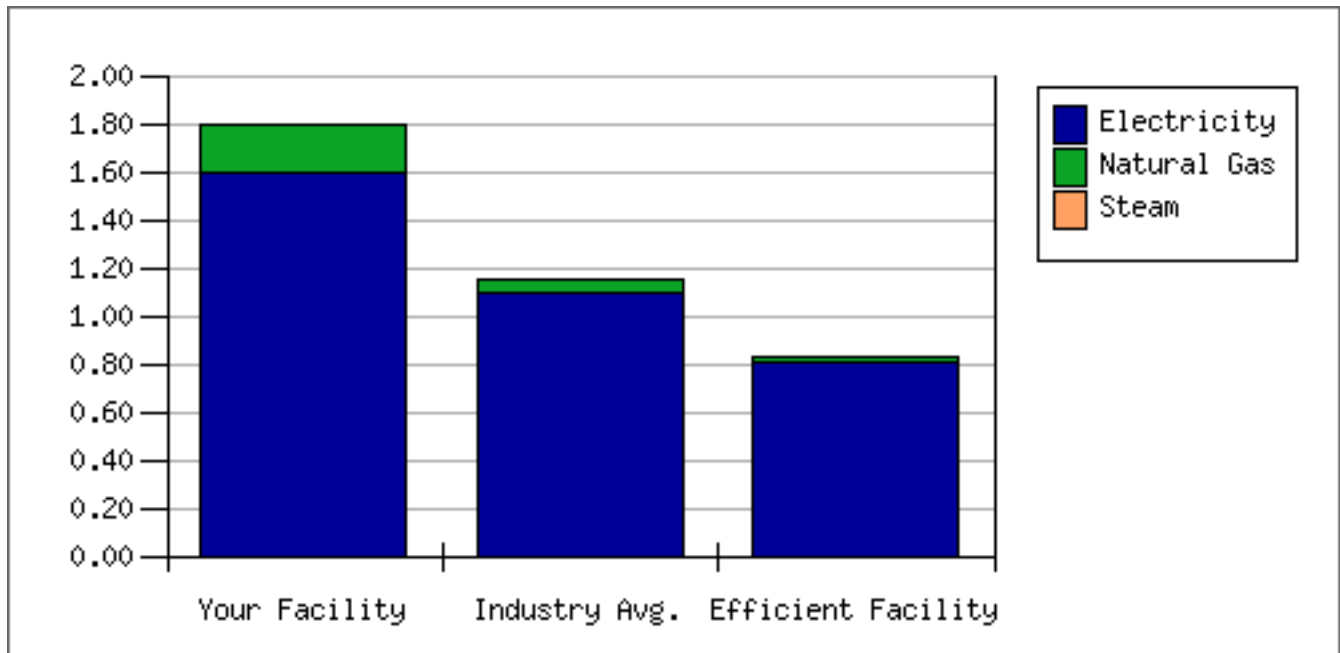


Table 1: Comparison of Energy Use for 1 Sample to the Industry Average and an Energy Efficient middle/high school

	Electricity	Natural Gas	Steam	Total
Your Facility	\$ 1.60	\$ 0.20	\$ 0.00	\$ 1.80
Industry Average	\$ 1.10	\$ 0.06	\$ 0.00	\$ 1.16
Efficient Facility	\$ 0.81	\$ 0.02	\$ 0.00	\$ 0.83

3.2 End Use Breakdown

Figures 2 and 3, followed by Table 2, illustrate the energy end use breakdown for 1 Sample. End uses with the largest costs typically represent the areas for the greatest savings opportunities.

Figure 2: Energy Cost End Use Breakdown of 1 Sample

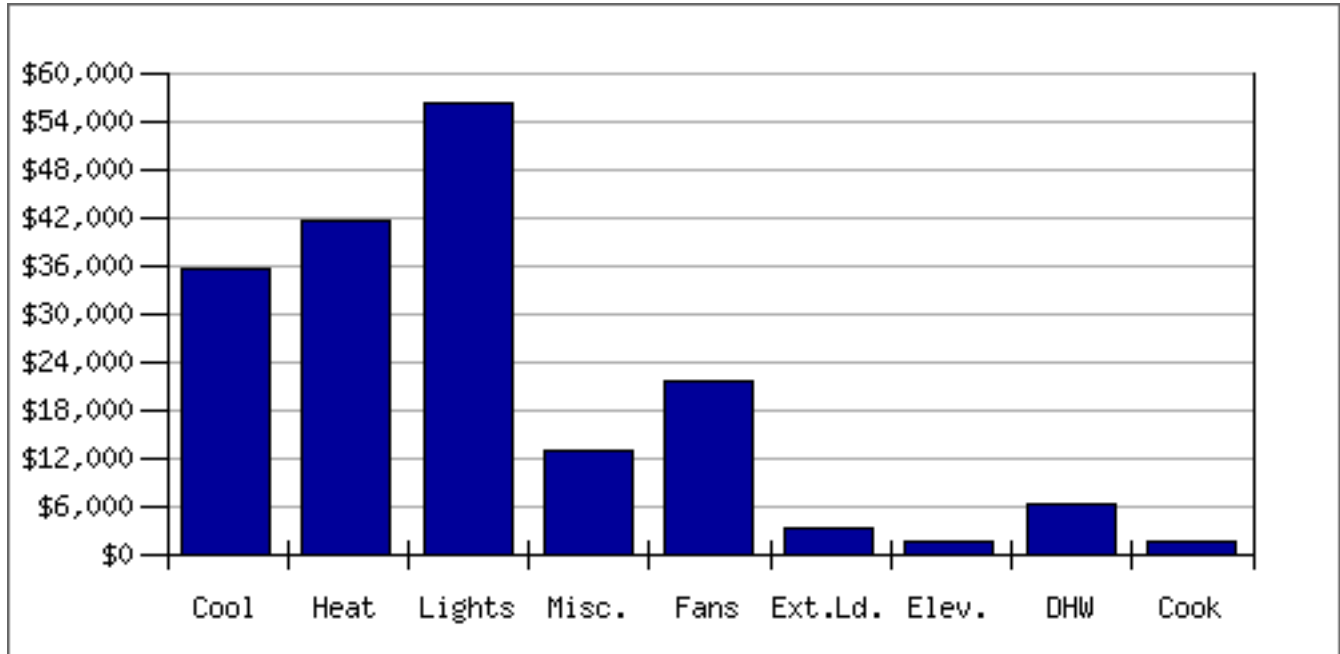


Figure 3: Energy End Use Breakdown of 1 Sample

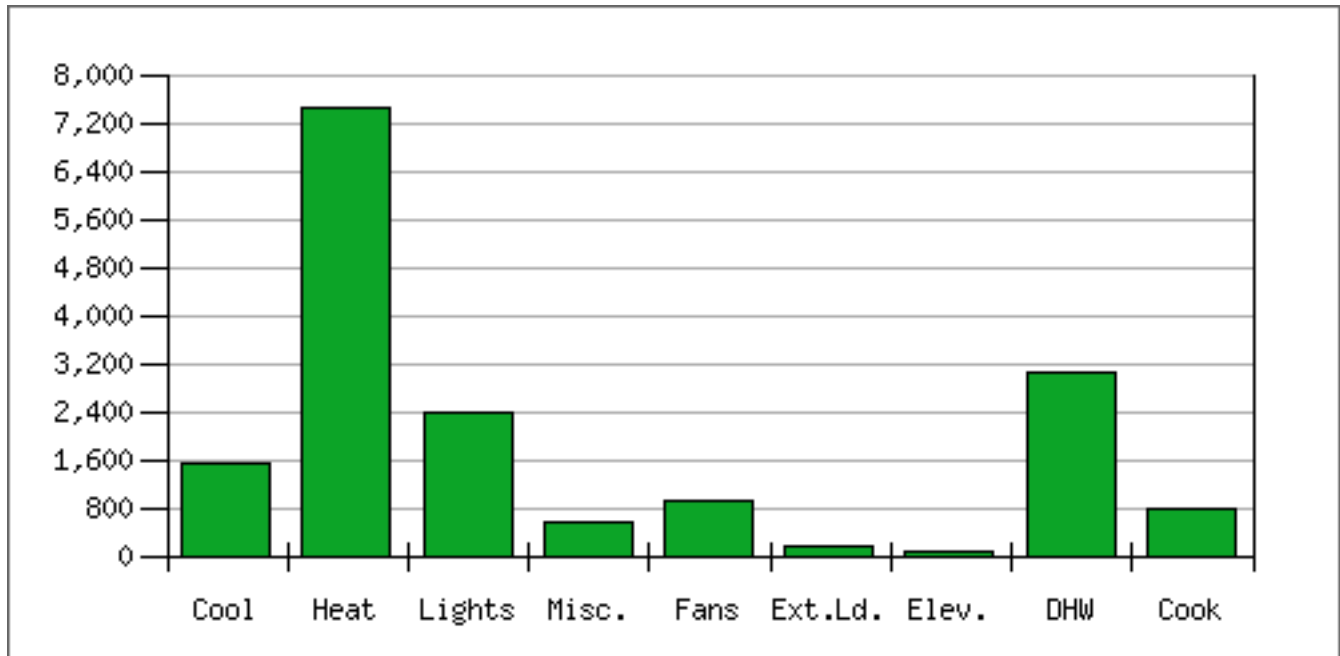


Table 2: Energy End Use Breakdown of 1 Sample

End Uses	Cost		Energy	
	Dollars	Percent	mmBtu	Percent
Space Cooling (Cool)	\$35,661	19.8%	1,521.0	9.0%
Space Heating (Heat)	\$41,547	23.1%	7,429.5	44.2%
Interior Lighting (Lights)	\$56,127	31.2%	2,393.9	14.2%
Misc. Equipment (Misc.)	\$12,670	7.0%	540.4	3.2%
Fans & Pumps (Fans)	\$21,471	11.9%	915.8	5.4%
Exterior Loads (Ext.Ld.)	\$3,259	1.8%	139.0	0.8%
Elevators (Elev.)	\$1,635	0.9%	69.7	0.4%
Domestic Hot Water (DHW)	\$6,110	3.4%	3,055.1	18.2%
Cooking (Cook)	\$1,520	0.8%	759.9	4.5%
Totals	\$180,000	100%	16,824	100%

3.3 Greenhouse Gas Emissions

Greenhouse gases, particularly carbon dioxide, are known to cause global warming and are linked to the production of energy. Figure 4 below illustrates greenhouse gas emissions generated by your energy consumption as compared to the industry average and an energy efficient facility.

Figure 4: Greenhouse Gas Emissions (metric tons of CO₂)

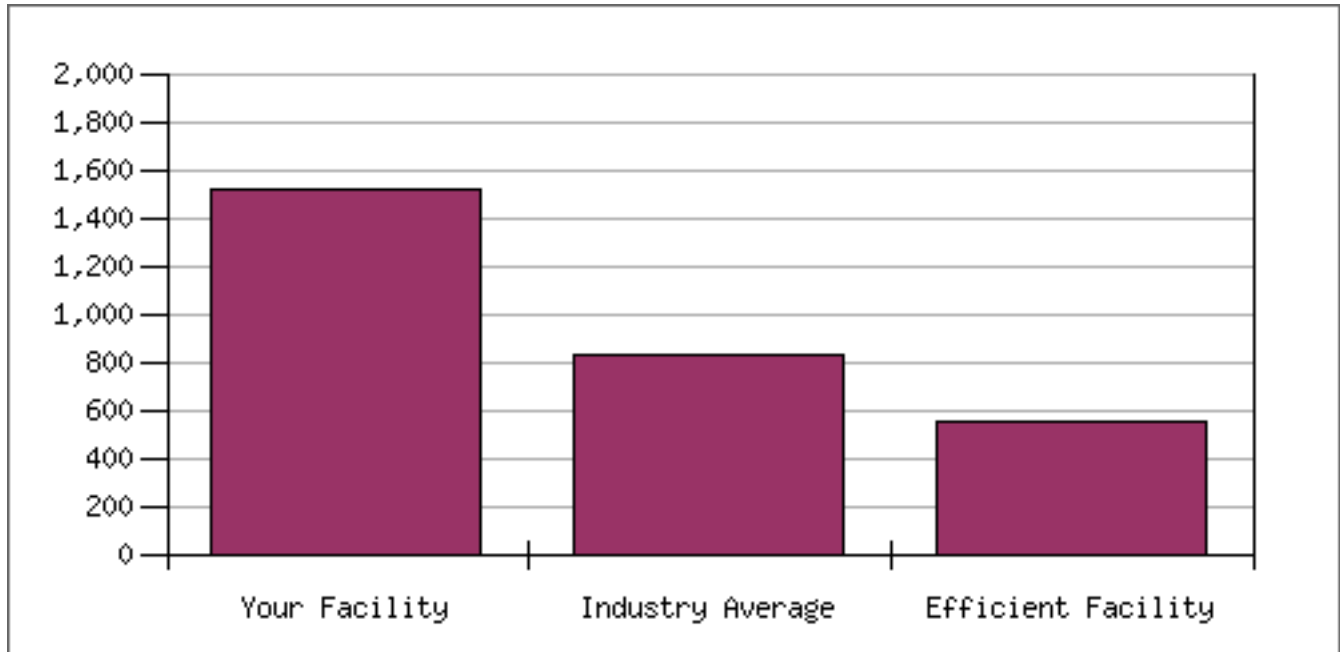


Table 3: Your Facility's CO₂ Output Comparison

	Annual Metric Tons of CO ₂
Your Facility	1,511.5
Industry Average	830.6
Energy Efficient Facility	547.8
Typical Automobile	3.8

By reducing your consumption level to that of the industry average, you would save 681 metric tons of CO₂ per year. That's equivalent to taking 179 automobiles off the road each year. The savings are even more significant when reducing your consumption to that of an energy efficient facility — you would save 964 tons, which is equivalent to removing 254 automobiles from the road each year.

4. Retrofit Opportunities

Significant energy savings can accrue from implementing a combination of best energy management practices and upgrading or installing new, more energy efficient technology. The greatest potential savings opportunities for 1 Sample are summarized below.

4.1 Low and No-Cost Opportunities

Energy savings of from 3 to 15 percent can be realized by adopting best energy management practices. These opportunities typically require little or no cost to implement. Suggested best energy management practices for 1 Sample include the following:

Your Energy Saving Opportunities

- **Holiday Shut-down:** Make sure lighting systems, office equipment and heating, ventilation, and air conditioning equipment is turned off during extended holiday periods; a surprising number of schools keep some equipment on when not needed.
- **Lighting:** Train staff, particularly cleaning crews, to turn off lights in unoccupied areas; many schools have been observed keeping lights on unnecessarily when classrooms are unoccupied.
- **Office Equipment:** Turn off office equipment and appliances and invoke energy saving features. Computers, monitors, copiers, fax machines, and printers often have energy saving modes which are not activated and most office equipment is left on unnecessarily.
- **Outdoor Air:** Check that minimum outdoor air levels are at recommended requirements which maintain proper indoor air quality; many buildings actually bring in much more outdoor air than necessary.
- **Operation & Maintenance:** Have mechanical systems checked and maintained on a regularly scheduled basis. At least 10% in energy savings may be expected for systems that are properly maintained versus those which are serviced only when problems occur. Moreover, equipment life is prolonged, leading to further cost savings.
- **HVAC Controls:** Have controls for heating, ventilation and air conditioning (HVAC) equipment checked to ensure that they are operating at optimum levels.

4.2 Energy Conservation Measure Opportunities

Based on the energy profile for 1 Sample, the following energy efficiency measures represent the greatest potential for savings. Note that most measures are not additive and cannot be summed to obtain a cumulative total savings estimate.

Table 4: Opportunities

Opportunity	Action Item
Lighting	Retrofit interior lighting with more efficient system to reduce overall lighting demand (0.9 W/ft ² , 10.6 W/m ²)
Demand Ventilation	Use carbon dioxide and/or occupancy sensors to control outside air while maintaining indoor air quality
Fans	Install variable speed fans and controls on applicable air handling units
Infiltration	Caulk and weather strip around doors, windows and other building penetrations to reduce air leakage into the building (infiltration reduced 50%)
Heat Recovery	Install heat recovery equipment to extract waste heat from exhausted air (30% effective overall)
Domestic Hot Water	Reduce the temperature of the domestic hot water system to provide 122°F (50°C) water
Cooling	Optimize `free cooling` by providing for the ability to provide more outside air outside when the air temperature is below the cooling setpoint

5. Next Steps

The Trane Energy Analyzer assessment has evaluated a number of energy saving measures that can be taken immediately and others that will require additional information and planning. The following steps are suggested:

Planning

- Develop an energy efficiency improvement target for your business
- Identify a person who will become the "energy champion" for your business
- Develop a detailed plan for how to achieve your target
- Identify how energy efficiency improvements link to achievement of your business objectives both directly and indirectly to create motivation for action

Immediate No Cost/Low Cost Energy Savings Opportunities

- Develop a plan to implement the suggestions from section 4.1
- Review the Products and Services section on our web site for more ideas
- Develop an employee awareness and communications program to gain broad support and participation for your energy savings initiatives

Retrofit Improvements

- Enhance your energy management expertise by visiting the Products and Services section of our web site.
- Conduct a cost/benefit analysis to determine if the project meets your organization's investment criteria. Remember to take into account the influence of "cross effects"⁴ when evaluating the long-term benefits of your project. Contact us or your own contractor for assistance.

⁴ Making an upgrade to one system may influence another system. For example, improving the efficiency of your lighting may impact your air conditioning.

6. Trane Energy Analyzer Disclaimer

This report is a Preliminary Energy Assessment, which serves to investigate possible energy conservation opportunities and is based on the information provided by and interviews with customer personnel. The recommendations are based on an analysis of conditions observed and information gathered at the time of the survey and is based on historical information. Statements concerning energy savings are projections only and actual savings to be realized by the customer are dependent upon many factors, including conservation measures implemented, seasonal weather variations, fuel price, and specific energy use practices of the facility occupants and workers. Nothing contained in this report constitutes a guarantee by Trane that the projected savings will be realized by the customer.

This report, by itself, is not intended, as a basis for the engineering required to adopt any of these recommendations. Its intent is to interest the customer in the potential cost savings of the recommendations. Development of design documents and specifications typically will be required to successfully implement the recommendations.